



FINAL SUBMITTAL

VOLUME III, APPENDICES G AND H

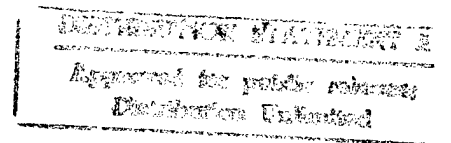
ENERGY ENGINEERING ANALYSIS PROGRAM STUDY FORT LEONARD WOOD, MISSOURI

Prepared for

KANSAS CITY DISTRICT
CORPS OF ENGINEERS
KANSAS CITY, MISSOURI

Under

CONTRACT NO. DACA41-92-C-0098



E M C ENGINEERS, INC.
Denver, Colorado
Atlanta, Georgia

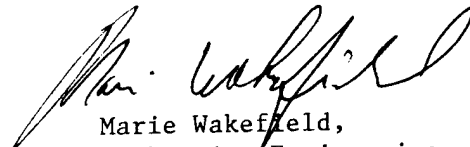


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FINAL SUBMITTAL

VOLUME III, APPENDICES G AND H

**ENERGY ENGINEERING ANALYSIS PROGRAM STUDY
FORT LEONARD WOOD, MISSOURI**

Prepared for

**KANSAS CITY DISTRICT
CORPS OF ENGINEERS
KANSAS CITY, MISSOURI**

Under

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December 1993

EMC No. 3204-000

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FOR QUALITY INSPECTION

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- B EMCS APPLICATIONS PROGRAMS
- C I/O SUMMARY TABLES
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- E HVAC SYSTEM ECONOMIC SUMMARY

PREVIOUSLY SUBMITTED

Volume II

- F ENERGY CALCULATIONS

Volume III

- G COST ESTIMATES
- H FIELD SURVEY NOTES

Volume IV

- I COMPUTER SIMULATIONS

LIST OF ABBREVIATIONS

AC	-	air conditioning
ACC	-	anticipated contract cost
ACCU	-	air cooled condensing unit
ACM	-	asbestos containing material
ACU(s)	-	auxiliary control unit(s)
AHU	-	air handling unit
AI	-	analog input
AO	-	analog output
ASCII	-	American Standard Code for Information Interchange
ASHRAE	-	American Society of Heating, Refrigeration, and Air conditioning Engineers
B/C	-	benefit-to-cost ratio
BCD	-	binary coded decimal
BLDG	-	building
BEACON	-	Building Energy Simulation Program
Btu	-	British thermal units
Btuh	-	British thermal units per hour
B/W	-	black and white
C	-	Celsius
CCC	-	central communications controller
ccf	-	one hundred (100) cubic feet
CCU	-	central control unit
cf	-	cubic foot, cubic feet

cfm	-	cubic feet per minute
CLM	-	command line mnemonic
CLMI	-	command line mnemonic interpreter
COE	-	Corps of Engineers
COS	-	central operator station
CPU	-	central processing unit
CRT	-	cathode ray tube
CU(s)	-	control unit(s)
CWE	-	current working estimate
d	-	day(s)
DCP	-	duty cycle program
DEH	-	Directorate of Engineering and Housing
DHW	-	direct memory access
DI	-	digital input
DO	-	digital output
DOD	-	Department of Defense
DPW	-	Department of Public Works
DTM	-	data transmission media
DX	-	direct expansion
E/C	-	energy-to-cost ratio
ECIP	-	Energy Conservation Investment Program
ECO	-	energy conservation opportunity
EEAP	-	energy engineering analysis program
eff	-	efficiency

elec.	-	electricity
EMC	-	EMC Engineers, Inc.
EMCS	-	energy monitoring and control system
EMI	-	electromagnetic interference
ESCO	-	energy service company
F	-	Fahrenheit
FO	-	fiber optic(s)
ft	-	foot, feet
ft ²	-	square feet
FY	-	fiscal year
gal	-	gallon(s)
hp	-	horsepower
hr	-	hours(s)
H & V	-	heating and ventilating
HVAC	-	heating, ventilation, and air conditioning
in.	-	inch(es)
I/O	-	input/output
kBtu	-	one thousand British thermal units
kcf	-	one thousand cubic feet
klb	-	one thousand pounds
kva	-	kilovolt - ampere
kW	-	kilowatt, one thousand watts
kWh	-	kilowatt-hour, one thousand watt-hours
lb	-	pound(s)

LCCA	-	life cycle cost analysis
LED	-	light emitting diode
LPG	-	liquified petroleum gas
MAU	-	make-up air unit
MBtu	-	one million Btu
MCR	-	master control room
MHz	-	megahertz
Mh	-	man-hours(s)
mo	-	months(s)
MW	-	megawatt, one million watts
MWh	-	megawatt-hour, one million watt-hours
MZAHU	-	Multizone air handling unit
NA	-	Not active or Not applicable
NG	-	natural gas
NOAA	-	National Oceanic and Atmospheric Administration
no.	-	number
OA	-	outside air
O&M	-	operation and maintenance
PM	-	preventative maintenance
PROM	-	programmable read-only memory
psi(a)(g)	-	pounds per square inch (absolute) (gage)
RAM	-	random access memory
RCU(s)	-	remote control unit(s)
RTC	-	real-time clock

RTDOS/E	-	real-time disk operating system /executive
S&A	-	Supervision and Administration
scfm	-	sea-level cubic feet per minute
SES	-	shared energy savings
SIOH	-	supervision, inspection, and overhead
SIR	-	savings-to-investment ratio
SPW	-	single present worth
sq.ft.	-	square feet
st/sp	-	start/stop
stm	-	steam
SZAHU	-	single zone air handling unit
t	-	ton
temp	-	temperature
TRY	-	test reference year
UA	-	overall heat transfer coefficient (Btu/hr/ft ² /°F)
UCU(s)	-	unitary control unit(s)
UH	-	unit heater
UPW	-	uniform present worth
VAV	-	variable air volume
wk	-	week(s)
yr	-	year(s)

APPENDIX G
COST ESTIMATES

ALTERNATIVE NO. 1
COST ESTIMATE SUMMARY

COST ESTIMATE ANALYSIS

PROJECT		LOCATION		INVOITATION NO./CONTRACT NO.		EFFECTIVE PRICING		DATE PREPARED					
EEAP STUDY - EXPANSION OF EMCS		FT. LEONARD WOOD, MISSOURI		DACA 41-92-C-0098		DATE MAR. 93		27-Dec-93					
				CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/>		DRAWING NO.		SHT OF					
				OTHER		ESTIMATOR		CHECKED BY					
ALTERNATIVE NO. 1 SUMMARY		Quantity		LABOR		EQUIPMENT		MATERIAL		TOTAL		SHIPPING	
TASK DESCRIPTION		No. Of Units	Unit Meas	MH/ Unit	Total Hrs	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost	Unit Wt	Total Wt
EMC SOFTWARE/DATABASE		1	LS				\$93,000						\$93,000
EMCS CENTRAL EQUIPMENT		1	LS				\$7,500						\$7,500
TRAINING		1	LS										\$33,750
DOCUMENTATION AND SUBMITTALS		1	LS				\$110,343						\$24,000
TESTING		1	LS										\$110,343
FIELD HARDWARES		1	LS										\$1,696,902
FO DATA TRANSMISSION MEDIA (DTM)		1	LS				\$97,418		\$26,652		\$98,859		\$222,929
SUBTOTAL							\$308,261		\$26,652		\$98,859		\$2,188,424
OVERHEAD		15.00%					\$46,239		\$3,998		\$14,829		\$328,264
PROFIT		10.00%					\$30,826		\$2,665		\$9,886		\$218,842
BOND		2.50%					\$7,707		\$666		\$2,471		\$54,711
CONTINGENCY		10.00%					\$39,303		\$3,398		\$12,605		\$279,024
ANTICIPATED CONTRACT COST							\$432,336		\$37,379		\$138,650		\$3,069,264
S&A		5.50%					\$23,778		\$2,056		\$7,626		\$168,810
CURRENT WORKING ESTIMATE							\$456,115		\$39,435		\$146,276		\$3,238,074
FIRST YEAR MAINTENANCE COST		11.00%											\$97,147
TOTAL THIS SHEET													

COST ESTIMATE ANALYSIS

PROJECT EEAP STUDY -- EXPANSION OF EMCS		INVITATION NO./CONTRACT NO. DACA 41-92-C-0098				EFFECTIVE PRICING DATE MAR 93		DATE PREPARED 27-Dec-93	
LOCATION FT. LEONARD WOOD, MISSOURI		<input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER				DRAWING NO.		SHT OF	
		ESTIMATOR		KC		CHECKED BY		CEL	
		MATERIAL		TOTAL		SHIPPING			
		Unit Price		Cost		Unit Wt		Total Wt	
ALTERNATIVE NO. 1		LABOR		EQUIPMENT		MATERIAL		TOTAL	
TASK DESCRIPTION		MH/ Unit		Total Hrs		Unit Price		Cost	
No. Of Units		Unit Meas		Total Hrs		Unit Price		Cost	
DOCUMENTATION AND SUBMITTALS									
GROUP I T.D. PACKAGE		1 LS							
GROUP II T.D. PACKAGE		1 LS							
GROUP III T.D. PACKAGE		1 LS							
GROUP IV T.D. PACKAGE		1 LS							
GROUP V T.D. PACKAGE		1 LS							
TOTAL DOCUMENTATION								\$24,000	
TESTING									
FACTORY TEST		1 LS		120.0		\$40		\$4,800	
PERF. VERIFICATION TEST		1 LS		80.0		\$40		\$3,200	
ENDURANCE TEST		1 LS		128.0		\$40		\$5,120	
OPPOSITE SEASON TEST		1 LS		56.0		\$40		\$2,240	
CONTRACTOR FIELD TEST (DIGITAL)		1368 PNT		0.8		1026.0		\$26,450	
CONTRACTOR FIELD TEST (ANALOG)		2085 PNT		1.3		2658.4		\$68,533	
TOTAL TESTING								\$110,343	
TOTAL THIS SHEET								\$134,343	

ALTERNATIVE NO. 2
COST ESTIMATE SUMMARY

[illegible]

ALTERNATIVE NO. 3
COST ESTIMATE SUMMARY

COST ESTIMATE BACKUP DATA

Index	Description	MH/Unit	Comm Cost	TOTAL MH/Unit	Inst. rate (\$/Hr)	Material (\$)	Comm Cost (\$)	TOTAL (\$)
DO1	Control Relay	1.3	1	2	\$25.78	\$32.60	\$10.80	\$43.40
DO2	H/O/A & Control Relay	2.0	1	3	\$25.78	\$65.80	\$10.80	\$76.60
DO3								\$0.00
DO4								\$0.00
AO1	CPA (Electric)	3.0	1	4	\$25.78	\$280.50	\$14.70	\$295.20
AO2	Remote Readout	2.0	1	3	\$25.78	\$176.11	\$14.70	\$190.81
AO3	CPA (Damper)	2.0	1	3	\$25.78	\$280.50	\$14.70	\$295.20
AO4	CPA (Valve)	2.0	1	3	\$25.78	\$280.50	\$14.70	\$295.20
AO5	ACU (Fan Coil)	2.5	1	4	\$25.78	\$400.00	\$14.70	\$414.70
AO6								\$0.00
DI1-1	Pressure Switch (Elec)	1.5	1	2	\$25.78	\$41.09	\$10.80	\$51.89
DI1-2	Pressure Switch (Plum)	1.0	1	2	\$24.39	\$40.00	\$10.80	\$50.80
DI2	Auxiliary Contact	1.0	1	2	\$25.78	\$32.00	\$10.80	\$42.80
DI3	Status Relay	1.0	1	2	\$25.78	\$30.64	\$10.80	\$41.44
DI4	Flame Failure	1.0	1	2	\$25.78	\$30.64	\$10.80	\$41.44
DI5	Diff. Pressure Sw. (Fan)	2.5	1	3	\$25.78	\$60.24	\$10.80	\$71.04
DI6	Diff. Pressure Sw. (Filter)	2.5	1	3	\$25.78	\$60.24	\$10.80	\$71.04
DI7	End Position Switch	1.0	1	2	\$25.78	\$58.00	\$10.80	\$68.80
DI8	Current Switch	1.0	1	2	\$25.78	\$100.00	\$10.80	\$110.80
DI9								\$0.00
DI10								\$0.00
DI11								\$0.00
AI1-1	Temp. Water (Elec)	2.0	1	3	\$25.78	\$207.43	\$14.70	\$222.13
AI1-2	Temp. Water (Plum)	1.0	1	2	\$24.39	\$50.35	\$14.70	\$65.05
AI2-1	Stack Temp. (Elec)	2.0	1	3	\$25.78	\$137.50	\$14.70	\$152.20
AI2-2	Stack Temp. (Plum)	1.0	1	2	\$24.39	\$40.00	\$14.70	\$54.70
AI3-1	PSIG/PSID (Elec)	2.0	1	3	\$25.78	\$187.50	\$14.70	\$202.20
AI3-2	PSIG/PSID (Plum)	1.0	1	2	\$24.39	\$40.00	\$14.70	\$54.70
AI4-1	Oxygen Analyser (Elec)	7.0	1	8	\$25.78	\$3,400.00	\$14.70	\$3,414.70
AI4-2	Oxygen Analyser (Plum)	1.0	1	2	\$24.39	\$100.00	\$14.70	\$114.70
AI5-1	Flow (Elec)	2.0	1	3	\$25.78	\$722.00	\$14.70	\$736.70
AI5-2	Flow (Plum)	1.0	1	2	\$24.39	\$71.00	\$14.70	\$85.70
AI6	Temp. Space	1.5	1	3	\$25.78	\$159.22	\$14.70	\$173.92
AI7	Temp. Duct	2.0	1	3	\$25.78	\$170.14	\$14.70	\$184.84
AI8	Temp. Avg. Duct	2.5	1	4	\$25.78	\$175.21	\$14.70	\$189.91
AI9	RH Space	1.5	1	3	\$25.78	\$225.00	\$14.70	\$239.70
AI10	Position	2.0	1	3	\$25.78	\$176.11	\$14.70	\$190.81
AI11	kW	2.0	1	3	\$25.78	\$388.89	\$14.70	\$403.59
AI12	Amp.	3.0	1	4	\$25.78	\$106.95	\$14.70	\$121.65
AI13	Temp. Space (RTD Only)	1.5	1	3	\$25.78	\$34.92	\$14.70	\$49.62

COMMON COST								
IFLDT	Quantity	Unit	MH/Unit	Labor	Total	Price	Total	Total
Wiring #18-1 pair	60	ft	0.01	26	\$15.47	0.08	\$4.80	\$20.27
1/2" EMT Conduit	40	ft	0.002	26	\$1.55	0.15	\$6.00	\$7.55
Termination	1	LS	0.25	26	\$6.45		\$0.00	\$6.45
Sub Total			0.91		\$23.46		\$10.80	\$34.26
Analog Points	Quantity	Unit	MH/Unit	Labor	Total	Price	Total	Total
Wiring #18 TSP	80	ft	0.01	26	\$20.62	0.09	\$7.20	\$27.82
1/2" EMT Conduit	50	ft	0.002	26	\$1.93	0.15	\$7.50	\$9.43
Termination	1	LS	0.25	26	\$6.45		\$0.00	\$6.45
Sub Total			1.13		\$29.00		\$14.70	\$43.70

BLDG NO.	BLDG USE	UNDER-GROUND DTM CONDUIT (FT.)	AERIAL POLE DTM LINE (FT.)	COST FOR U.G. DTM (\$)	COST FOR A.P. DTM (\$)	TOTAL COST FOR DTM PER BLDG (\$)
181	Sewage Plant		803		\$923.5	\$923.5
183	Sewage Plant	120	402	\$535.2	\$462.3	\$997.5
184	Sewage Plant	50	402	\$223.0	\$462.3	\$685.3
185	Sewage Plant	50	402	\$223.0	\$462.3	\$685.3
186	Sewage Collection	160	402	\$713.6	\$462.3	\$1,175.9
187	Sewage Plant	50	402	\$223.0	\$462.3	\$685.3
193	Sewage Pump Bldg	50	402	\$223.0	\$462.3	\$685.3
194	Sewage Plant	75	402	\$334.5	\$462.3	\$796.8
195	Sewage Plant	75	402	\$334.5	\$462.3	\$796.8
196	Sewage Plant	520	402	\$2,319.2	\$462.3	\$2,781.5
198	Sewage Plant	75	402	\$334.5	\$462.3	\$796.8
199	Sewage Plant	75	402	\$334.5	\$462.3	\$796.8
320	Administration	175		\$780.5		\$780.5
404	Telephone Exchange	400	725	\$1,784.0	\$833.8	\$2,617.8
498	Old Commisary	50	650	\$223.0	\$747.5	\$970.5
604	Wallace Pool		1,575		\$1,811.3	\$1,811.3
625	Battalion HQ		610		\$701.5	\$701.5
626	Administration/Supply		550		\$632.5	\$632.5
627	Barracks, with a/c	100	305	\$446.0	\$350.8	\$796.8
628	Barracks, with a/c	75	405	\$334.5	\$465.8	\$800.3
629	Barracks, with a/c	25	400	\$111.5	\$460.0	\$571.5
630	Mess Hall		320		\$368.0	\$368.0
633	Administration/Supply	175	505	\$780.5	\$580.8	\$1,361.3
634	Barracks, with a/c	125	530	\$557.5	\$609.5	\$1,167.0
635	Barracks, with a/c	100	430	\$446.0	\$494.5	\$940.5
636	Brigade HQ	100	225	\$446.0	\$258.8	\$704.8
637	Chapel		350		\$402.5	\$402.5
638	Clinic	75		\$334.5		\$334.5
639	PX		500		\$575.0	\$575.0
650	Battalion HQ		425		\$488.8	\$488.8
651	Barracks, with a/c		250		\$287.5	\$287.5
652	Barracks, with a/c	150		\$669.0	\$0.0	\$669.0
653	Mess Hall		300		\$345.0	\$345.0
654	Barracks, with a/c		475		\$546.3	\$546.3
655	Administration/Supply		375		\$431.3	\$431.3
656	Administration/Supply		420		\$483.0	\$483.0
657	Mess Hall		220		\$253.0	\$253.0
658	Battalion HQ	100		\$446.0	\$0.0	\$446.0
659	Barracks, with a/c		475		\$546.3	\$546.3
660	Barracks, with a/c		450		\$517.5	\$517.5
672	Motor Pool	150	360	\$669.0	\$414.0	\$1,083.0
673	Motor Pool	60	360	\$267.6	\$414.0	\$681.6
680	Motor Pool	250	360	\$1,115.0	\$414.0	\$1,529.0
681	Motor Pool	60	360	\$267.6	\$414.0	\$681.6
730	Barracks, w/o a/c		450		\$517.5	\$517.5
731	Barracks, w/o a/c		750		\$862.5	\$862.5

BLDG NO.	BLDG USE	UNDER-GROUND DTM CONDUIT (FT.)	AERIAL POLE DTM LINE (FT.)	COST FOR U.G. DTM (\$)	COST FOR A.P. DTM (\$)	TOTAL COST FOR DTM PER BLDG (\$)
732	Battalion HQ		560		\$644.0	\$644.0
733	Administration/Supply		325		\$373.8	\$373.8
734	Administration/Supply		250		\$287.5	\$287.5
735	Mess Hall		425		\$488.8	\$488.8
736	Barracks, w/o a/c		325		\$373.8	\$373.8
737	Barracks, w/o a/c		560		\$644.0	\$644.0
738	Barracks, w/o a/c		550		\$632.5	\$632.5
739	Mess Hall		350		\$402.5	\$402.5
740	Battalion HQ		550		\$632.5	\$632.5
741	Brigade HQ		875		\$1,006.3	\$1,006.3
750	Battalion HQ		225		\$258.8	\$258.8
751	Administration/Supply		350		\$402.5	\$402.5
752	Administration/Supply		400		\$460.0	\$460.0
753	Battalion HQ		680		\$782.0	\$782.0
768	Kanell Hall	125	520	\$557.5	\$598.0	\$1,155.5
772	Motor Pool	60	183	\$267.6	\$210.5	\$478.1
773	Motor Pool	100	182	\$446.0	\$209.3	\$655.3
780	Motor Pool	125	182	\$557.5	\$209.3	\$766.8
781	Motor Pool	60	183	\$267.6	\$210.5	\$478.1
802	Day Care	125	520	\$557.5	\$598.0	\$1,155.5
815	Barracks, w/o a/c		550		\$632.5	\$632.5
816	Barracks, w/o a/c		825		\$948.8	\$948.8
817	Barracks, w/o a/c		575		\$661.3	\$661.3
818	Barracks, w/o a/c		425		\$488.8	\$488.8
819	Barracks, w/o a/c	50	400	\$223.0	\$460.0	\$683.0
820	Mess Hall		200	\$0.0	\$230.0	\$230.0
822	Battalion HQ		280		\$322.0	\$322.0
823	Administration/Supply		880		\$1,012.0	\$1,012.0
824	Administration/Supply		400		\$460.0	\$460.0
825	Battalion HQ	100		\$446.0		\$446.0
826	Gym		425	\$0.0	\$488.8	\$488.8
827	Barracks, w/o a/c		575		\$661.3	\$661.3
828	Barracks, w/o a/c		425		\$488.8	\$488.8
829	Barracks, w/o a/c		425		\$488.8	\$488.8
830	Barracks, w/o a/c		675		\$776.3	\$776.3
831	Barracks, w/o a/c	200		\$892.0		\$892.0
832	Clinic		475		\$546.3	\$546.3
836	Mess Hall		700		\$805.0	\$805.0
837	Mess Hall		250		\$287.5	\$287.5
838	Battalion HQ		500		\$575.0	\$575.0
840	Administration/Supply		175		\$201.3	\$201.3
841	Administration/Supply		250		\$287.5	\$287.5
842	Battalion HQ		695		\$799.3	\$799.3
844	Brigade HQ		325		\$373.8	\$373.8
872	Motor Pool	50	470	\$223.0	\$540.5	\$763.5
873	Motor Pool	50	470	\$223.0	\$540.5	\$763.5

BLDG NO.	BLDG USE	UNDER-GROUND DTM CONDUIT (FT.)	AERIAL POLE DTM LINE (FT.)	COST FOR U.G. DTM (\$)	COST FOR A.P. DTM (\$)	TOTAL COST FOR DTM PER BLDG (\$)
880	Motor Pool	30	470	\$133.8	\$540.5	\$674.3
881	Motor Pool	30	470	\$133.8	\$540.5	\$674.3
990	Motor Pool	225	427	\$1,003.5	\$491.1	\$1,494.6
991	Motor Pool	75	428	\$334.5	\$492.2	\$826.7
998	Motor Pool	125	428	\$557.5	\$492.2	\$1,049.7
999	Motor Pool	125	427	\$557.5	\$491.1	\$1,048.6
1012	Barracks	250		\$1,115.0		\$1,115.0
1013	Barracks	163		\$727.0		\$727.0
1014	Barracks	163		\$727.0		\$727.0
1015	Barracks	163		\$727.0		\$727.0
1016	Barracks	163		\$727.0		\$727.0
1018	Medical Clinic	50	510	\$223.0	\$586.5	\$809.5
1022	Battalion HQ		135		\$155.3	\$155.3
1023	Battalion HQ		500		\$575.0	\$575.0
1025	Administration/Supply	125	515	\$557.5	\$592.3	\$1,149.8
1027	Mess Hall		270		\$310.5	\$310.5
1028	Barracks	275		\$1,226.5		\$1,226.5
1029	Barracks	100	100	\$446.0	\$115.0	\$561.0
1350	Reserve Center	150	475	\$669.0	\$546.3	\$1,215.3
1382	Car Wash	50	500	\$223.0	\$575.0	\$798.0
1383	Auto Craft Shop		1,000		\$1,150.0	\$1,150.0
1390	Reserve Motor Pool		1,210		\$1,391.5	\$1,391.5
1391	Reserve Maintenance		265		\$304.8	\$304.8
1601	Water Treatment	725		\$3,233.5		\$3,233.5
1700	Storage	700		\$3,122.0		\$3,122.0
1701	Administration/Supply	250	100	\$1,115.0	\$115.0	\$1,230.0
1702	Administration/Supply	325	325	\$1,449.5	\$373.8	\$1,823.3
1703	Battalion HQ	325	100	\$1,449.5	\$115.0	\$1,564.5
1704	Battalion HQ	150	200	\$669.0	\$230.0	\$899.0
1705	Admin./Courtroom	300	100	\$1,338.0	\$115.0	\$1,453.0
1706	Administration/Supply	300	100	\$1,338.0	\$115.0	\$1,453.0
1707	Administration/Supply	675		\$3,010.5		\$3,010.5
1711	PX	150	163	\$669.0	\$187.5	\$856.5
1712	Chapel	190	75	\$847.4	\$86.3	\$933.7
1714	Gym	300	162	\$1,338.0	\$186.3	\$1,524.3
1720	Barracks	150		\$669.0		\$669.0
1721	Dayroom	100		\$446.0		\$446.0
1722	Barracks	100		\$446.0		\$446.0
1723	Barracks	100		\$446.0		\$446.0
1724	Barracks	100		\$446.0		\$446.0
1725	Barracks	100		\$446.0		\$446.0
1726	Barracks	50		\$223.0		\$223.0
1727	Dayroom	75		\$334.5		\$334.5
1728	Barracks	225	100	\$1,003.5	\$115.0	\$1,118.5
1729	Barracks	100		\$446.0		\$446.0
1730	Barracks	125		\$557.5		\$557.5

BLDG NO.	BLDG USE	UNDER-GROUND DTM CONDUIT (FT.)	AERIAL POLE DTM LINE (FT.)	COST FOR U.G. DTM (\$)	COST FOR A.P. DTM (\$)	TOTAL COST FOR DTM PER BLDG (\$)
1731	Barracks	125		\$557.5		\$557.5
1732	Barracks	125	50	\$557.5	\$57.5	\$615.0
1733	Barracks	225	40	\$1,003.5	\$46.0	\$1,049.5
1734	Barracks	175		\$780.5		\$780.5
1735	Barracks	150	30	\$669.0	\$34.5	\$703.5
1736	Dayroom	100		\$446.0		\$446.0
1740	Mess Hall	425		\$1,895.5		\$1,895.5
1750	Administration	200	250	\$892.0	\$287.5	\$1,179.5
1760	Dayroom	100		\$446.0		\$446.0
1761	Barracks	125		\$557.5		\$557.5
1762	Barracks	125		\$557.5		\$557.5
1763	Barracks	125		\$557.5		\$557.5
1764	Barracks	125		\$557.5		\$557.5
1765	Barracks	125		\$557.5		\$557.5
1766	Barracks	125		\$557.5		\$557.5
1767	Barracks	150		\$669.0		\$669.0
1768	Barracks	150	200	\$669.0	\$230.0	\$899.0
1769	Barracks	100		\$446.0		\$446.0
1770	Dayroom	75		\$334.5		\$334.5
1771	Barracks	125		\$557.5		\$557.5
1772	Dayroom	60		\$267.6		\$267.6
1773	Barracks	150		\$669.0		\$669.0
1774	Barracks	125		\$557.5		\$557.5
1775	Barracks	125		\$557.5		\$557.5
1776	Barracks	125		\$557.5		\$557.5
2100	Reception Center	1,830	250	\$8,161.8	\$287.5	\$8,449.3
2105	Mess Hall	370	300	\$1,650.2	\$345.0	\$1,995.2
2240	MP Kennel	250	820	\$1,115.0	\$943.0	\$2,058.0
2250	Motor Pool	250	1,230	\$1,115.0	\$1,414.5	\$2,529.5
2273	Entomology		2,050		\$2,357.5	\$2,357.5
2399	Vet Clinic	325	753	\$1,449.5	\$866.0	\$2,315.5
2574	LPG Compressor Bldg	825		\$3,679.5		\$3,679.5
3210	Dayroom	30	150	\$133.8	\$172.5	\$306.3
3211	EOQ	75	523	\$334.5	\$601.5	\$936.0
3212	EOQ	100	522	\$446.0	\$600.3	\$1,046.3
3213	EOQ	30	523	\$133.8	\$601.5	\$735.3
3214	EOQ	100	522	\$446.0	\$600.3	\$1,046.3
3215	Central Plant	250	150	\$1,115.0	\$172.5	\$1,287.5
4051	Inflam. Material Storage	325	752	\$1,449.5	\$864.8	\$2,314.3
4052	Administration	100	245	\$446.0	\$281.8	\$727.8
4100	BEQ	50	735	\$223.0	\$845.3	\$1,068.3
4101	BEQ	50	525	\$223.0	\$603.8	\$826.8
4102	BEQ	50	550	\$223.0	\$632.5	\$855.5
4103	VOQ	50	575	\$223.0	\$661.3	\$884.3
4104	BEQ	50	550	\$223.0	\$632.5	\$855.5
4109	Officers Club	175	950	\$780.5	\$1,092.5	\$1,873.0

BLDG NO.	BLDG USE	UNDER-GROUND DTM CONDUIT (FT.)	AERIAL POLE DTM LINE (FT.)	COST FOR U.G. DTM (\$)	COST FOR A.P. DTM (\$)	TOTAL COST FOR DTM PER BLDG (\$)
4110	BOQ	180	937	\$802.8	\$1,077.6	\$1,880.4
4111	BOQ	30	938	\$133.8	\$1,078.7	\$1,212.5
4112	BOQ	150	805	\$669.0	\$925.8	\$1,594.8
4113	BOQ	350	690	\$1,561.0	\$793.5	\$2,354.5
4114	BOQ	500	525	\$2,230.0	\$603.8	\$2,833.8
4115	BOQ	275	525	\$1,226.5	\$603.8	\$1,830.3
5001	Airfield Fire House	621	240	\$2,769.7	\$276.0	\$3,045.7
5002	Airline Terminal	621	240	\$2,769.7	\$276.0	\$3,045.7
5004	Air Force Ops	621	240	\$2,769.7	\$276.0	\$3,045.7
5007	Hanger	622	240	\$2,774.1	\$276.0	\$3,050.1
5265	DOL	75	2,400	\$334.5	\$2,760.0	\$3,094.5
5266	Steam-Clean Facility	130		\$579.8		\$579.8
5267	Dispatch	275		\$1,226.5		\$1,226.5
5268	Wash Facility	290		\$1,293.4		\$1,293.4
5269	Car Wash	100		\$446.0		\$446.0
6150	Admin./Maintenance		1,190	\$0.0	\$1,368.5	\$1,368.5
6505	Water Treatment		7,075	\$0.0	\$8,136.3	\$8,136.3
7391	NCO Club	1,225	900	\$5,463.5	\$1,035.0	\$6,498.5
9000	Front Gate	225	8,450	\$1,003.5	\$9,717.5	\$10,721.0
TOTALS		27,527	87,095	\$122,770	\$100,159	\$222,930

STATUS RELAY

CONTROL RELAYS					
Model		Description	Contact Rating	List	Code
RHN1B-5-DC	24V	SPDT	5 AMP	12.44	B
RH1B-UAC	24V	SPDT	10 AMP	14.44	B
RH1B-UAC	120V	SPDT	10 AMP	14.44	B
RH1B-UDC	24V	SPDT	10 AMP	13.22	B
RH2B-UAC	24V	DPDT	10 AMP	15.42	B
RH2B-UAC	120V	DPDT	10 AMP	15.42	B
RH2B-UDC	24V	DPDT	10 AMP	14.30	B
RH2LB-UDC	12V	DPDT-LATCHING	10 AMP	40.28	B
RH2LB-UDC	24V	DPDT-LATCHING	10 AMP	40.28	B
RH3B-UAC	24V	3PDT	10 AMP	19.06	B
RH3B-UAC	120V	3PDT	10 AMP	19.06	B
RH3B-UDC	24V	3PDT	10 AMP	18.19	B
RH4B-UAC	24V	4PDT	10 AMP	23.33	B
RH4B-UAC	120V	4PDT	10 AMP	23.33	B
RH4B-UDC	24V	4PDT	10 AMP	22.61	B
(L)SUFFIX*		LIGHT		4.03	B
(C)SUFFIX*		CHECK BUTTON		2.06	B

*Not available with Single Pole Relays

HEAVY DUTY CONTROL RELAYS					
RR2P-UAC	24V	DPDT	10 AMP	24.28	B
RR2P-UAC	120V	DPDT	10 AMP	24.28	B
RR2P-UDC	24V	DPDT	10 AMP	22.75	B
RR3PA-UAC	24V	3PDT	10 AMP	29.11	B
RR3PA-UAC	120V	3PDT	10 AMP	29.11	B
RR3PA-UDC	24V	3PDT	10 AMP	28.47	B
(L)SUFFIX*		LIGHT	10 AMP	4.03	B
(C)SUFFIX*		CHECK BUTTON		2.06	B

CONTROL RELAY SOCKETS				
Model		Description	List	Code
SH1B-05		SPDT-RH RELAY SOCKET	8.06	B
SH2B-05		DPDT-RH RELAY SOCKET	9.86	B
SH3B-05		3PDT-RH RELAY SOCKET	10.81	B
SH4B-05		4PDT-RH RELAY SOCKET	14.11	B
SR2P-06		DPDT-RR RELAY SOCKET	8.06	B
SR3P-06		3PDT-RR RELAY SOCKET	10.81	B

MOUNTING TRACK			
BND-1000		39" RAIL	10.83 B
DIN-3F		2 METER (78.8")	20.84 B

$8 \times 0.5 = 6.61$
 ENCLOSURE 20
 26.61

$8 \times 0.5 = 4.03$
 $= 30.64$

100 ohm PLATINUM RTD SENSORS & TRANSMITTERS		• HY-CAL	
Model	Description	List	Code
RTS-5737-K-T	SPACE	69.83	A
RTS-5737-P-T	WATER	166.25	A
RTS-5737-G-T	DUCT	91.67	A
RTS-5737-W-T	OSA	91.67	A
RTS-5737-V-T	PIPE STRAP	255.56	A
CT-801 ⁽²⁾	TRANSMITTER	248.61	A

• Sensors are 100 ohm 385 Platinum

(2) Stocked temp. ranges: B1 - +30° to 240°F

B2 - -20° to 140°F

B3 - +32° to 122°F

1000 ohm PLATINUM RTD SENSORS & TRANSMITTERS		• HY-CAL	
CT-859-B ⁽¹⁾	RANGEABLE SPACE	276.39	A
RTS-5737-K-U	SPACE	69.83	A
RTS-5737-P-U	WATER	166.25	A
RTS-5737-G-U	DUCT	91.67	A
RTS-5737-W-U	OSA	91.67	A
RTS-5737-V-U	PIPE STRAP	255.56	A
CT-807 ⁽²⁾	TRANSMITTER	236.10	A
CT-809-A ⁽³⁾	RANGEABLE TRANSMITTER	221.95	A

• Sensors are 1000 ohm 375 Ultra-7 Platinum

(1) Includes element and transmitter

(2) Stocked temp. ranges: B1 - +30° to 240°F

B2 - -20° to 140°F

B3 - +32° to 122°F

(3) Factory calibrated 30° to 130°F

IMMERSION WELLS		• HY-CAL	
WEL-B-H	BRASS WELL	30.56	A
WEL-S-H	STAINLESS STEEL WELL	71.67	A

$71.67 \times 0.5 = 35.84$
PLUS PIPETAP 15
= 50.35

EXPLOSION-PROOF PLATINUM RTD SENSORS & TRANSMITTERS		• HY-CAL	
RTS-36-T	100Ω DOUBLE THREADED PROBE	211.72	A
RTS-37-T	100Ω SPRING LOADED PROBE	251.47	A
RTS-36-U	1000Ω DOUBLE THREADED PROBE	211.72	A
RTS-37-U	1000Ω SPRING LOADED PROBE	251.47	A
CT-881-A	RANGEABLE TRANSMITTER	1361.12	A

• COMPLETE HY-CAL LINE AVAILABLE. Delivery on non-stock items or larger than stock quantities is 6 to 8 weeks.

HUMIDITY SENSORS

Model	Description	Mfgr.	Range	Output	Accury.	List	Code
LCH-R	ROOM		10-90%	4-20ma	±5%	243.06	A
HW10K*	ROOM		0-100%	4-20ma	±3%	355.56	A
HD10K	DUCT/OSA		0-100%	4-20ma	±3%	383.34	A
EL3K	REPLACEABLE ELEMENT FOR HW10K, HD10K					208.34	A
HMD20U	DUCT/OSA	VAISALA	0-100%	4-20ma	±2%	738.89	A
HMD30U	DUCT/OSA	VAISALA	0-100%	0-5VDC	±2%	944.45	A
WMK-20	OSA SUN SHIELD AND MOUNTING KIT FOR VAISALA					41.67	A
HMW20U	ROOM	VAISALA	0-100%	4-20ma	±2%	619.45	A
HMW30U	ROOM	VAISALA	0-100%	0-5VDC	±2%	811.12	A
HMK20	HUMIDITY CALIBRATOR	VAISALA	0-100%	4-20ma	±2%	2208.35	A
HM34	PORTABLE RH METER	VAISALA	0-100%		±2%	1097.23	B
CT-829-A-MH	ROOM	HY-CAL	0-90%	4-20ma	±2%	450.00	A X 0.5 = 225
CT-829-H19-X20	DUCT	HY-CAL	0-90%	4-20ma	±2%	486.12	A X 0.5 = 243.06
CT-829-H19-X21	DUCT/OSA	HY-CAL	0-90%	4-20ma	±2%	486.12	A
CT-880B	EXPLOSION-PROOF TRANSMITTER	HY-CAL	0-100%	4-20ma	±2.5%	1805.55	A
SA-728-A	LOOP-POWERED METER	HY-CAL	0-100%			465.12	B
A21	ASPIRATED SENSOR HOUSING					277.78	B
T0	THERMISTOR TEMP. SENSOR OPT. FOR HW10K					26.39	A

*Thermistor Temperature Sensor Option Available (See catalog for available curves.)

ENTHALPY / WET BULB SENSOR

Model	Description	List	Code
EWB	ENTHALPY / WET BULB ASPIRATED ENCLOSURE (NO SENSOR)	1652.79	A
S13364PF	1,000 ohm 385 PLATINUM RTD WET OR DRY BULB SENSOR	183.34	A
TT151PF1EK	4-20ma TRANSMITTER 30° to 110°F ± .4°F MATCHED TO SENSOR	386.12	A
ST-EWB-3	4" LONG THERMISTOR 30° to 200°F ± .4°F WET OR DRY BULB SENSOR	69.44	A
J-6317-50	5 GAL. TRANSLUCENT DISTILLED WATER RESERVOIR	41.67	A
CLS	INTAKE FILTER WITH DISPOSABLE ELEMENT	208.33	A

CONTROL RELAYS

MODEL		TYPE	CONTACT RATING	LIST	PRICE CODE
RH1B-UAC	24V	SPDT	10 AMP	14.40	B
RH1B-UAC	120V	SPDT	10 AMP	14.40	B
RH1B-UDC	24V	SPDT	10 AMP	13.18	B
RH2B-UAC	24V	DPDT	10 AMP	15.37	B
RH2B-UAC	120V	DPDT	10 AMP	15.37	B
RH2B-UDC	24V	DPDT	10 AMP	14.62	B
RH2LB-UDC	12V	DPDT-LATCHING	10 AMP	40.22	B
RH2LB-UDC	24V	DPDT-LATCHING	10 AMP	40.22	B
RH3B-UAC	24V	3PDT	10 AMP	19.00	B
RH3B-UAC	120V	3PDT	10 AMP	19.00	B
RH3B-UDC	24V	3 PDT	10 AMP	18.14	B
RH4B-UAC	24V	4PDT	10 AMP	23.26	B
RH4B-UAC	120V	4PDT	10 AMP	23.26	B
RH4B-UDC	24V	4PDT	10 AMP	22.54	B
*(L)SUFFIX		LIGHT		5.54	B
*(C)SUFFIX		CHECK BUTTON		2.77	B

* Not available with Single Pole Relays

HEAVY DUTY CONTROL RELAYS

RR2P-UAC	24V	DPDT	10 AMP	24.20	B
RR2P-UAC	120V	DPDT	10 AMP	24.20	B
RR2P-UDC	24V	DPDT	10 AMP	22.68	B
RR3PA-UAC	24V	3PDT	10 AMP	29.02	B
RR3PA-UAC	120V	3PDT	10 AMP	29.02	B
RR3PA-UDC	24V	3PDT	10 AMP	28.39	B
(L)SUFFIX		LIGHT		5.54	B
(C)SUFFIX		CHECK BUTTON		2.77	B

CONTROL RELAY SOCKETS

SH1B-05	SPDT-RH RELAY	8.03	B
SH2B-05	DPDT-RH RELAY	9.83	B
SH3B-05	3PDT-RH RELAY	10.77	B
SH4B-05	4PDT-RH RELAY	14.07	B
SR2P-06	DPDT-RR RELAY	8.03	B
SR3P-06	3PDT-RR RELAY	10.77	B

MOUNTING TRACK

BND-1000	39" RAIL	10.80	B
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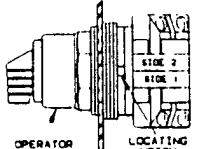
x.5 = \$7.70

x.5 = 4.90
 PLUS
 ENCLOSURE = 20.00
 PLUS
 SWITCH = 33.20
 TOTAL = \$66.00

NON-ILLUMINATED 3 POSITION SELECTOR SWITCH OPERATORS

3 Position Selector Switch Operators — U.L. Types 4, 4X, 13 (NEMA 4, 4X, 13)

Legend Plate and Contact Block Not Included Unless Noted

CONTACT BLOCK REQUIRED				1 - Contact Closed 0 - Contact Open												Price			
Contact Block Position	Quantity and Type		Mount on Side		Center		Center		Center		Center		Center		Center				
					Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left		Right		
 Top View	KA1	KA3	KA1 #2	KA3 #2	1	0	0	1	0	0	0	0	1	0	0	1	0		
	OR	KA2		KA2 #2	0	1	1	0	0	1	0	1	0	0	1	0	1		
	KA1	KA3	KA1 #1	KA3 #1	0	0	1	1	0	0	0	1	0	0	1	1	0		1
	OR	KA2		KA2 #1	1	1	0	0	0	1	0	1	0	0	1	1	0		0
CAM				B	C	D	E	F	G	J	L								
NON-ILLUMINATED OPERATORS				Type	Type	Type	Type	Type	Type	Type	Type	Type	Type	Type	Type	Type	Type		
Manual Return(1) Operator Only(1) Without Knob With Standard Black Knob With Other Color Knob (See Table)(2)				SKS42 SKS42B SKS42(2)	SKS43 SKS43B SKS43(2)	SKS44 SKS44B SKS44(2)	SKS45 SKS45B SKS45(2)	SKS46 SKS46B SKS46(2)	SKS47 SKS47B SKS47(2)	SKS49 SKS49B SKS49(2)	SKS401 SKS401B SKS401(2)	SKS401B SKS401(2)	SKS401B SKS401(2)	SKS401B SKS401(2)	SKS401B SKS401(2)	SKS401B SKS401(2)	\$18.00 22.20 22.20		
With Contact Blocks With Standard Black Knob (See Table for Other Colors) Replace B in Type Number with Other Color Code With 1 KA1 on Side #2 (H13) With 1 KA1 on Side #1 (H1) With 1 KA1 on Side #1 and 1 KA1 on Side #2 (H2)				SKS42BH13 SKS42BH1 SKS42BH2	SKS43BH13 SKS43BH1 SKS43BH2	SKS44BH13 SKS44BH1 SKS44BH2	SKS45BH13 SKS45BH1 SKS45BH2	SKS46BH13 SKS46BH1 SKS46BH2	SKS47BH13 SKS47BH1 SKS47BH2	SKS49BH13 SKS49BH1 SKS49BH2	SKS401BH13 SKS401BH1 SKS401BH2	SKS401BH13 SKS401BH1 SKS401BH2	SKS401BH13 SKS401BH1 SKS401BH2	SKS401BH13 SKS401BH1 SKS401BH2	SKS401BH13 SKS401BH1 SKS401BH2	SKS401BH13 SKS401BH1 SKS401BH2	40.20 40.20 68.20		
Spring Return From Left To Center(1) Operator Only(1) Without Knob With Standard Black Knob With Other Color Knob (See Table)(2)				SKS62 SKS62B SKS62(2)	SKS63 SKS63B SKS63(2)	SKS64 SKS64B SKS64(2)	SKS65 SKS65B SKS65(2)	SKS66 SKS66B SKS66(2)	SKS67 SKS67B SKS67(2)	SKS69 SKS69B SKS69(2)	SKS601 SKS601B SKS601(2)	SKS601B SKS601(2)	SKS601B SKS601(2)	SKS601B SKS601(2)	SKS601B SKS601(2)	SKS601B SKS601(2)	30.00 34.20 34.20		
Spring Return From Right To Center(1) Operator Only(1) Without Knob With Standard Black Knob With Other Color Knob (See Table)(2)				SKS72 SKS72B SKS72(2)	SKS73 SKS73B SKS73(2)	SKS74 SKS74B SKS74(2)	SKS75 SKS75B SKS75(2)	SKS76 SKS76B SKS76(2)	SKS77 SKS77B SKS77(2)	SKS79 SKS79B SKS79(2)	SKS701 SKS701B SKS701(2)	SKS701B SKS701(2)	SKS701B SKS701(2)	SKS701B SKS701(2)	SKS701B SKS701(2)	SKS701B SKS701(2)	30.00 34.20 34.20		
Spring Return Both Sides To Center(1) Operator Only(1) Without Knob With Standard Black Knob With Other Color Knob (See Table)(2)				SKS52 SKS52B SKS52(2)	SKS53 SKS53B SKS53(2)	SKS54 SKS54B SKS54(2)	SKS55 SKS55B SKS55(2)	SKS56 SKS56B SKS56(2)	SKS57 SKS57B SKS57(2)	SKS59 SKS59B SKS59(2)	SKS501 SKS501B SKS501(2)	SKS501B SKS501(2)	SKS501B SKS501(2)	SKS501B SKS501(2)	SKS501B SKS501(2)	SKS501B SKS501(2)	30.00 34.20 34.20		

(1) These operators can be ordered complete with contact blocks — for maximum block usage — see page 13-54. Add the "H" number chosen from page 13-50 to the end of the operator type number and add the cost of the "H" number to the operator cost.

EXAMPLE: SKS43FB(22.20) + H13(KA1 Pos. 2)(18.00) =

SKS43FBH13(40.20).

(2) Add the color code as chosen from knob color table.

EXAMPLE: SKS43(2) with a green gloved hand knob = SKS43FG

Selector Switch Knobs

Color	Standard Knob		Gloved Hand Knob		Coin Operated		Price
	(2) Knob Code	Type	(2) Knob Code	Type	(2) Knob Code	Type	
	(2) Knob Code	Type	(2) Knob Code	Type	(2) Knob Code	Type	
Black	B	B11	FB	B25	TB	B18	\$4.20
Red	R	R8	FR	R24	TR	R16	
Green	G	G8	FG	G24	TG	G16	
Yellow	Y	Y8	FY	Y24	TY	Y16	
Orange	S	S11	FS	S25	—	—	
Blue	L	L8	FL	L24	TL	L16	
White	W	W8	FW	W24	—	—	
Amber	A	A8	FA	A24	—	—	
Clear	C	C8	FC	C24	TC	C16	

For Basic Operators — See page 13-54.

For Boots — See page 13-53.

For Contact Blocks — See page 13-48.

For "H" Numbers — See page 13-50.

For Legend Plates — See pages 13-51 - 13-52.

For Lockouts — See page 13-53.

For Outline Dimensions — See pages 13-57 - 13-58.

For Ratings — See page 13-48.

For Replacement Parts — See page 13-56.

For Ring Nuts — See page 13-56.

FOR OFFICIAL USE ONLY

ELECTRONIC / PNEUMATIC TRANSDUCER

MODEL UEP-018

$$\frac{644}{550} \times 0.5 = \frac{322}{275}$$

DESCRIPTION

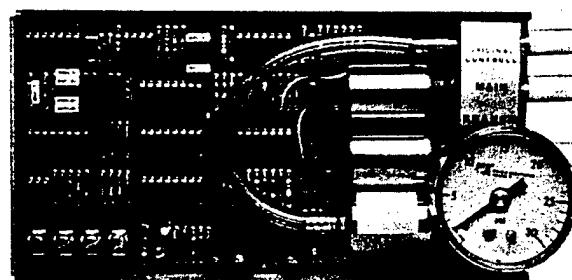
The Model UEP-018 is a crystal-controlled, electronic/pneumatic pulse width modulated transducer that converts a pulse width modulated input to a 0-18 PSIG pressure output. The UEP-018 has voltage feedback which is proportional to the output pressure. The optional failsafe model transfers control to a backup pneumatic controller when a system failure is detected. The UEP-018 replaces the MEP-018.

FEATURES

- Can be mounted in any position
- High air capacity
- One-piece air valve / transducer assembly
- No constant air bleed
- High accuracy
- No calibration required
- Maintains pressure on loss of power
- Quick-disconnect terminals
- Pressure feedback voltage
- Snap-track mounting
- Optional branch pressure gauge
- Optional failsafe

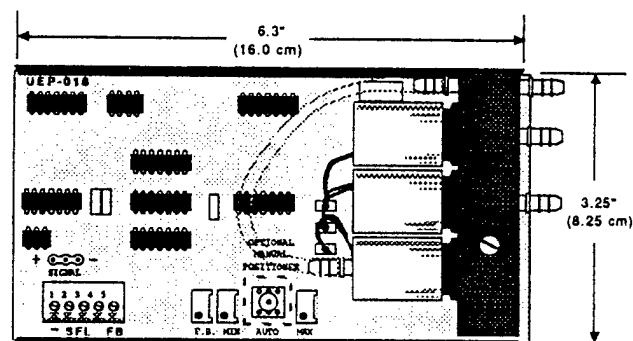
OPERATION

The Model UEP-018 accepts a universal 24VDC (+ or -) pulse width modulated signal with a time base of .2 to 25.5 seconds. This pulse width modulated input produces a 0 to 18 PSIG output pressure which is proportional to the length of pulse input. The output pressure is monitored and maintained at the last command regardless of small air leaks or bleed restrictions in the branch line. The output pressure is changed by any pulse input that is different from the last one received. The output pressure is converted to a voltage feedback signal, which can be monitored by the controlling computer.



UEP-018 shown with optional PG-05 gauge

DIMENSIONS



The optional failsafe model has an additional air valve which transfers control to a standard pneumatic controller should a system failure condition be detected. Any interruption of power at the FL terminals will cause the UEP-018 to revert to the failsafe condition.

SPECIFICATIONS

Supply voltage	24VDC $\pm 10\%$ @ 90ma	Output resolution	.017 PSIG(1.17mbar)
Input signal	± 24 VDC	Feedback voltage	1-8VDC, adjustable 1-10 max
Input signal pulse	.2 to 25.5 seconds	Linearity	.5% of span
Maximum press. rating	40 PSIG/2.76 bar	Hysteresis	.5% of span
Operating input press.	20 PSIG/1.4 bar	Humidity	5-95% noncondensing
Output pressure	0-18 PSIG/0...1.24 bar	Operating temp. range	35° to 105°F
Output capacity	1150 SCIM @ 20 PSIG(1.36kg/hr.)	Temperature drift	.5PSI(.034 bar) or better, 35° to 105°F
		Dimensions	3.25" x 6.3" (8.25 cm x 16.0 cm)

ELECTRONIC/PNEUMATIC TRANSDUCER

MODEL UEP-018

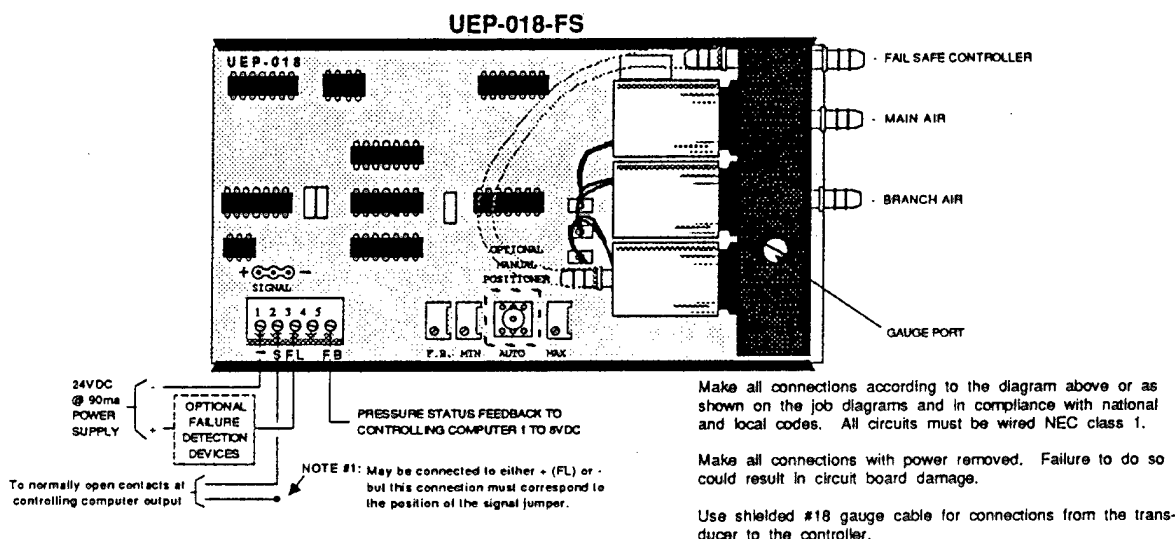
INSTALLATION

Mounting

Mount device inside an enclosure near the controlled equipment avoiding areas of temperature extremes, corrosive vapors, or electromagnetic interference. Use track slots for screw attachment.

Protect circuit board from metal filings created during panel construction.

Barbed fittings are provided for terminating 1/4" plastic tubing.



CHECKOUT

Tools Required: (voltmeter, CLC-100-PW1 Signal Analyzer)

Verify with a voltmeter that 24VDC is present across terminals "-" and "FL". Position the pulse width input jumper (J2) for the correct "-" or "+" polarity input mode. Verify that 20 PSIG(1.4 bar) main air is present.

To Check Transducer Operation:

1. Input a pulse of 25.5 seconds (use CLC-100-PW1). The branch pressure should go to 18 PSIG(1.24 bar) when the pulse is complete.
2. Input a pulse of 0.2 seconds. The branch pressure should go to 0 PSIG when the pulse is complete.

NOTE

This is a functional check only. The UEP-018 is a highly accurate device and laboratory quality gauges are required to properly check calibration.

Calibration

The UEP-018 is factory-calibrated for an output span of 0-18 PSIG. If a tighter span is required the MIN and MAX potentiometers are provided. To calibrate the span using the CLC-100-PW1 Signal Analyzer: input a pulse of .2 seconds; adjust the MIN potentiometer for the desired low pressure; input a pulse of 25.5 seconds; adjust the MAX potentiometer until the desired output pressure is reached; recheck the MIN setting and readjust as necessary. Repeat as necessary to achieve accurate results.

ORDERING INFORMATION

MODEL UEP-018
MODEL UEP-018-FS
PG-05

STANDARD MODEL
FAILSAFE MODEL
OPTIONAL GAUGE

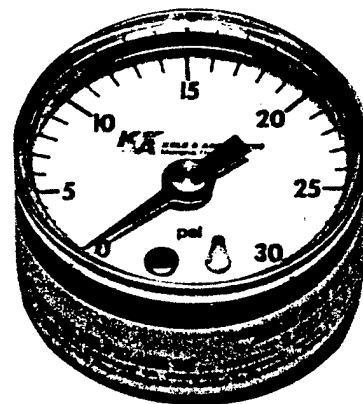
PRESSURE GAUGE

MODEL PG-05

7.98 X 0.7 = \$5.586

DESCRIPTION

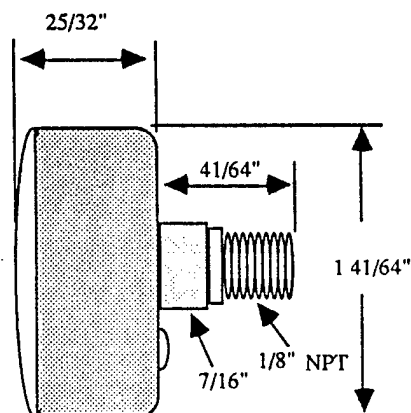
The PG-05 Pressure Gauge is for continuous indication of air pressure in pneumatic control systems. The PG-05 Gauge uses a spring-suspended movement which is largely resistant to the effects of shock, pulsation and vibration. The result of this is longer gauge life and greater reliability.



SPECIFICATIONS

Air pressure Input	0-30 PSI
Accuracy	±2.5% of full scale
Air connection	1/8" NPT
Window	Polycarbonate push-in
Case	Epoxy painted steel
Socket	Brass
Operating temperature	-40° to 150°F (-40° to 65°C)
Humidity	95% noncondensing

DIMENSIONS



ELECTRONIC / PNEUMATIC TRANSDUCER

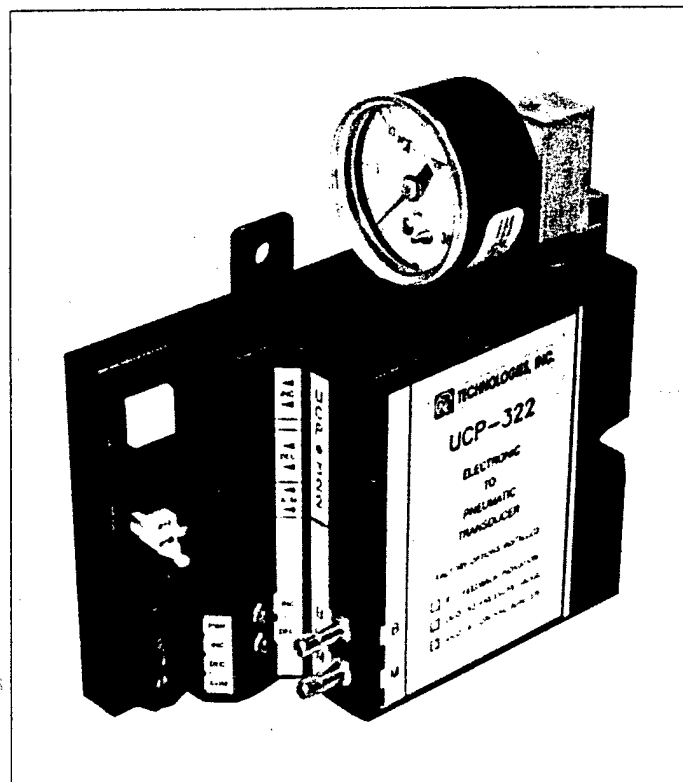
$$186.11 \times 0.5 = 93.06$$
MODEL UCP-322

DESCRIPTION

The **Model UCP-322 Electro/Pneumatic Transducer** is designed for direct digital control of pneumatic valves and dampers. Its low cost makes it ideal for applications on variable air volume terminal boxes. The transducer features low current, high cycle-rated, electro/pneumatic valves mounted in a **Noryl Plastic Enclosure**. For manual control of the output pressure, an increase/decrease switch is furnished. LED visual status is provided to verify the correct air valve selection. Visual pressure indication is optional using a top-mounted gauge.

FEATURES

- **Low cost**
- **Small size**
- **No bleed air consumption**
- **Momentary manual override for quick checkout**
- **Valve status LED**
- **AC or DC operation**
- **Quick-disconnect terminals for easy field service**
- **Low power draw**



APPLICATION

The **UCP-322** is controlled from two discrete contact closures (or one tri-state output) from a controlling computer. Using a *puff-puff* technique, the *increase* or *decrease* air valves are pulsed to vary the branch air pressure. The branch pressure can be manually controlled by a technician during checkout by pressing *increase* or *decrease* momentary override switches located on the **UCP-322**. Note that the jumpers must be in *manual* position before the push buttons will work. For checkout situations where the pneumatic connections are complete but no control power is available, a portable battery pack may be used to provide power for manual valve positioning.

OPTIONS

- R - RESTRICTED OUTPUT** (.007 restrictor for installation in the branch line)
- F - FEEDBACK** - Allows remote electronic readout of the output pressure. Standard calibration is for 3-15 PSI = 4-20ma.
- UCO-43 - PRESSURE GAUGE INDICATION** - Allows for local pressure indication without giving up valuable panel space.
- UCO-47 - DIN RAIL MOUNTING ADAPTER** - Allows the UCP-322 to be mounted with relays on the same track.

SPECIFICATIONS

Supply voltage	24VAC or VDC \pm 10%	Maximum pressure	30 PSI (2.07 bar)
Power rating	1.5 watts	Dimensions	4 1/2"H x 2 "W x 4 3/4"D
Output capacity	Restricted: 46 SCIM @ 20 PSI (.054kg/hr.) Unrestricted: 1030 SCIM @ 20 PSI (1.2kg/hr.)	Temperature	32° to 110°F (0° - 43°C)
		Humidity	0-95°RH noncondensing

ELECTRONIC / PNEUMATIC TRANSDUCER

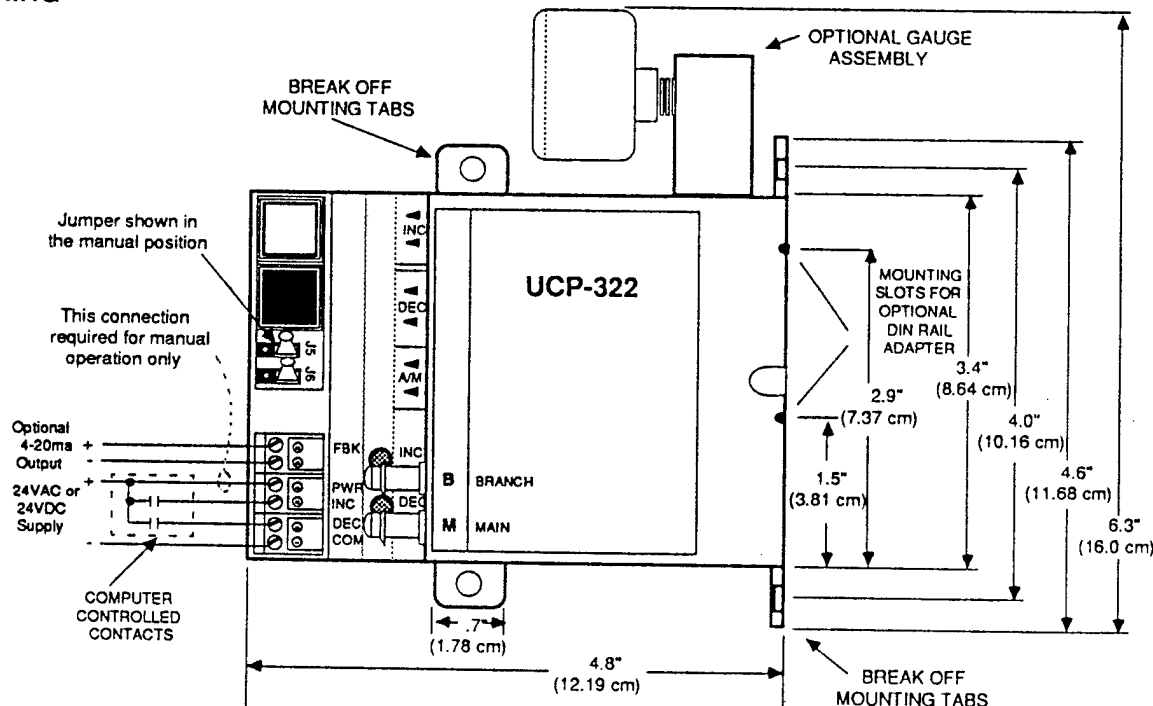
MODEL UCP-322

INSTALLATION

Mounting

Mount the UCP-322 inside a NEMA 1 Control Panel in a clean, dry environment. Barbed fittings are provided for terminating 1/4 inch O.D. plastic tubing. The transducer is not position-sensitive. **Restrictor:** If restricted air volume is desired, a .007 restrictor "R" must be ordered to be placed in series with the branch output.

WIRING



For computer operation, the jumpers must be in the *auto* position. The transducer is 24VAC or 24VDC. Manual operation is only possible if 24V is wired to the "PWR" terminal. The jumpers must be in the *manual* position before the push buttons will work.

ORDERING INFORMATION

BASE MODEL	OPTIONS
UCP-322	List in alphabetical order, one or two options
F	Feedback - allows remote 4-20ma electronic readout of the output pressure.
R	Restricted output (.007 restrictor for installation in the branch line field installed)

UCP-322 - R - 43 - 47

Example: Standard UCP-322 with restrictor output; pressure indication and DIN rail mount

**FACTORY INSTALLED OPTIONS (FIELD REPLACEABLE)

- To order these options, add the option number in Alpha / Numeric order as shown above
- UCO-43 Pressure Gauge Indication - allows for local pressure indication without giving up valuable panel space.
- UCO-47 DIN Rail Mounting Adapter - allows the UCP-322 to be mounted along with relays on the same track.
- ** Options are factory installed only (see option data sheets for details).

PRESSURE-ELECTRIC SWITCH

P10 SERIES

$$58.50 \times 0.7 = 41.09$$

4

DESCRIPTION

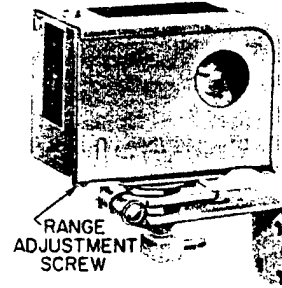
A change in operating pressure positions a preformed Buna-N diaphragm which actuates an electrical switch. Controls with SPDT contacts have color coded terminals; the common terminal is red; the red to yellow terminals close an electrical circuit on a rise in pressure; the red to blue terminals close a circuit on a drop in pressure.

APPLICATION

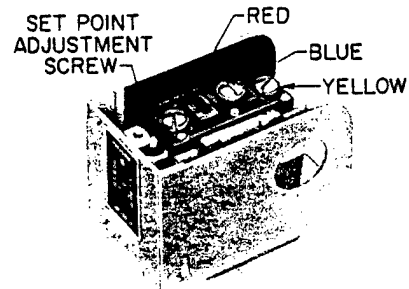
The P10 Pressure Control uses changes in operating pressure to open or close an electrical circuit. Typical applications include: pressure-electric switches in pneumatic systems, control of pumps or small air compressors, and pressure-electric interlock of fluid flow systems. The P10BJ and P10FH are available for electric heating applications.

FEATURES

- Screw terminals are easily accessible for field wiring
- Snap-acting contacts in a dust-tight enclosure
- Visible calibration scale
- Field adjustment can be made with cover on or removed
- Gas and oil resistant nylon reinforced diaphragm



P10 Single Stage Pressure Control with barbed fitting and mounting bracket attached



Interior view of P10BG with terminals identified

SPECIFICATIONS

Electrical Ratings - (For each Pennswitch)

P10BC, P10FC, P10PA

Motor Ratings VAC	120	208	240	277
AC Full Load amp	16.0	9.2	8.0	7.0
AC Locked Rotor amp	96.0	55.2	48.0	42.0
Non-Inductive amp	16.0	9.2	8.0	7.2

Pilot Duty — 125 VA at 24 to 277 VAC

NOTE: On 2 and 3 stage models, the maximum connected load shall not exceed 2000 VA.

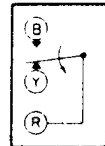
Maximum allowable pressure: 150 PSIG (1034 kPa)

P10BJ

Motor Ratings VAC		120	208	240	277	600
AC Full Load amp		16.0	9.2	8.0	—	—
AC Locked Rotor amp		96.0	55.2	48.0	—	—
Non-Ind. amp	Double Throw	16.0	16.0	16.0	16.0	16.0
	Single Throw	24.0	24.0	24.0	24.0	24.0

Pilot Duty — 125 VA at 24 to 600 VAC

Series P10



ACTION ON INCREASE OF PRESSURE

Catalog Number	Number of Stages	Contact Action	Range PSIG (kPa)	Factory Setting				Pressure Connector NPT	Ship wt lb
				PSIG (kPa)		Switch Diff PSI (kPa)			
P10BC-7	1	SPDT	3 to 20 (21 to 138)	12 (R to Y Cut-in)		2		1/8 in.	1.0
P10BJ-1									
P10FC-4	2	SPDT		(R-Y Cutout) Low Stage	(R-Y Cut-in) High Stage	Low Stage	High Stage	1/8 in.	1.5
				8 (55)	12 (82)	2 (14)	2 (14)		
P10PA-11	3	SPST	3 to 20 (21 to 138)	Stage 1 Open Low	Stages 2 & 3 Open High	Stage 1	Stages 2 & 3	1/8 in.	1.5
				6 (41)	17.4 (120)	3 (21)	4 (3)		

ORDERING INFORMATION

To order: Specify catalog number only.

PRESSURE AIR SENSING SWITCHES

$$40.48 \times 0.5 = 20.24$$

MODELS RH-3 / RH-3-2

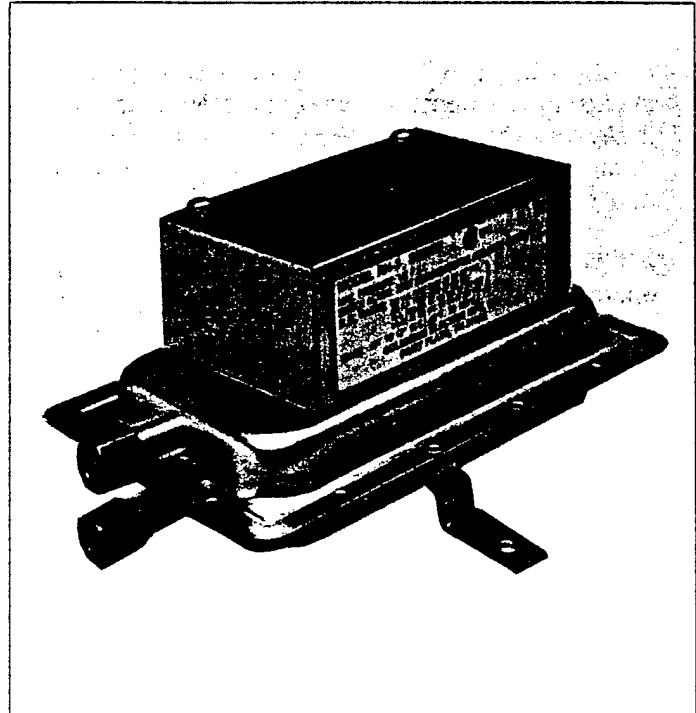
DESCRIPTION

RH-3 and RH-3-2 Air Flow Switches are used to sense pressure or vacuum or differentials of pressure or vacuum. Typical applications are to prove blower operation, sense dirty filters, signal buildup of frost and operate air cleaners in heat-pump installations.

Standard individual package includes 1/4" compression fittings suitable for use with 1/4" O.D. copper or plastic tubing and a 12" length of 1/4" plastic tubing.

OPERATION

When pressure is applied to the high side of the air flow switch or vacuum applied to the low side an internal diaphragm moves against and operates the lever of the snap switch. When the air flow switch is at rest (not operating) the snap switch N.C. contact is made to common. When an increase in differential pressure operates the snap switch, the "normally open" contact is made to the common terminal. The action of the diaphragm on the snap switch is the same whether pressure or vacuum is being controlled or sensed. The wiring from the air flow switch to other devices depends upon the application.



4

SPECIFICATIONS

S.P. Range:	RH-3 .05" \pm .02" to 12.0" \pm .1" W.C.	Electrical rating	300VAC pilot duty at 125-277VAC
	RH-3-2 .05" \pm .02" to 2.0" \pm .04" W.C.		15 amp resistive at 125VAC
Switch differential	.04" W.C. at minimum setting		1/4 HP at 125VAC
	.8" W.C. at maximum setting		1/2 HP at 250VAC
Maximum pressure	1/2 PSI	Contact arrangement	SPDT
Operating temp.	-40° to +180°F	Approval	UL, CSA
Mounting position	any vertical plane		

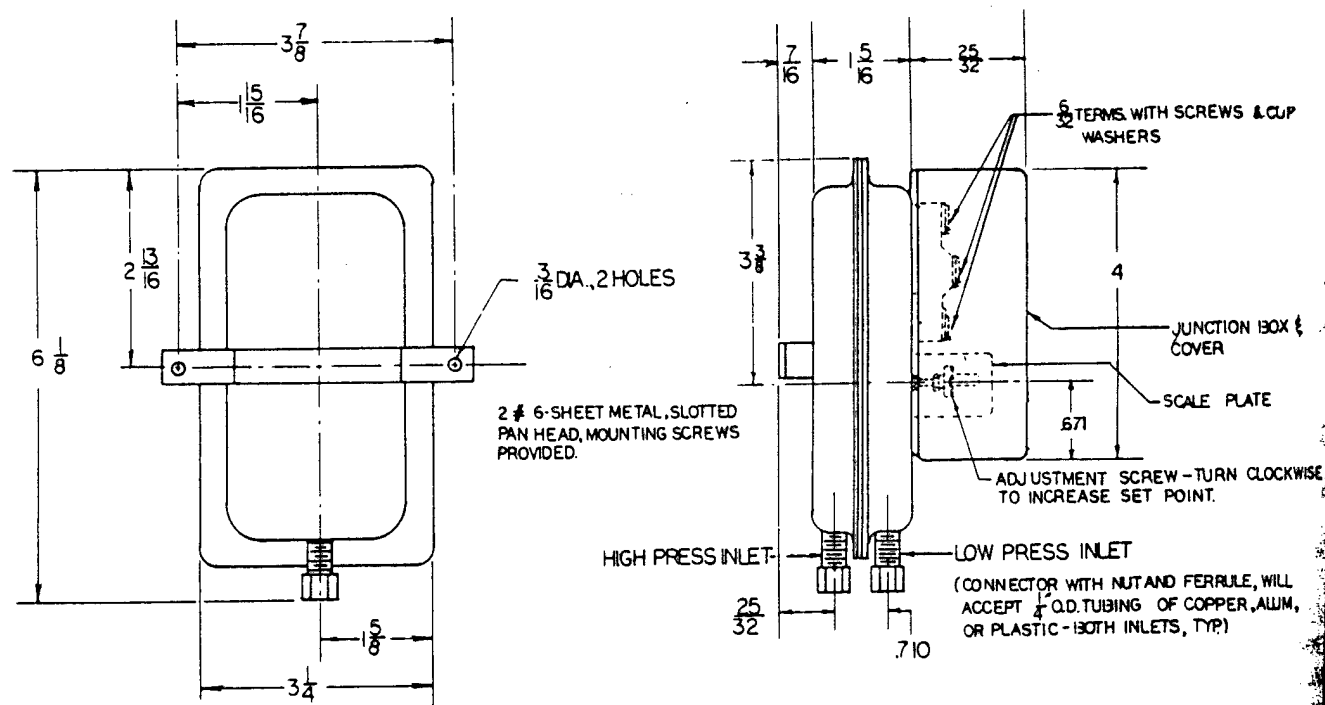
PRESSURE AIR SENSING SWITCHES

MODELS RH-3 / RH-3-2

4

ADJUSTMENT: The adjusting screw located in the junction box may be used to change the operating point. The operating range is .05" to 12.0" W.C. The differential is .04 rising to .8 at highest setting, i.e., the switch will operate at .05 and reset before .01 on the low end and operate at 12.0" and reset before 11.2" on the high end. Rotate adjusting screw clockwise to increase setting.

DIMENSIONS



DIFFERENTIAL PRESSURE TRANSMITTER

625X0.5=312.50

MODEL XLdp

DESCRIPTION

The new Ashcroft® XLdp introduces a variable capacitance sensor within a glass clad silicon chip. The patented SI-Glas technology combines the inherent high sensitivity of a variable capacitance transducer with a micromachined, ultra-thin, silicon diaphragm.

The Ashcroft SI-Glas Sensor now enables precise measurement and control of very low pressure. Although the ultra-thin silicon diaphragm deflects only microns, the sensor is 100 times more sensitive to pressure than available silicon piezo-resistive pressure sensors.

The SI-Glas Sensor is composed of only sputtered metals and glass molecularly bonded to silicon. There are no epoxies or other organics to contribute to drift or mechanical degradation over time. The glass clad silicon diaphragm withstands extreme overpressure as well as severe shock and vibration. The SI-Glas Sensor construction, superior packaging techniques and unique Ashcroft circuit provide extraordinary long term stability.

This major sensor advance enables repeatable measurement and control of gas flows as low as 30 feet/minute (9.14 meters/min.) in most energy management, industrial, medical or aerospace applications.

FEATURES

- Certified 0.5% and 1% accuracy
- High overload protection
- Flame-proof NEMA 2 metal construction

- Internal power regulation
- Calibration certification
- Easy installation



SPECIFICATIONS

PERFORMANCE CHARACTERISTICS

Standard Ranges (Inches W.C.)

(Uni or Bidirectional):

±0/0.1	±0/2.5
±0/0.25	±0/3.0
±0/5	±0/5.0
±0/1.0	±0/10.0
±0/2.0	±0/25.0

Other ranges available

Accuracy Class (F.S.)

	0.5%	1.0%
Non-lin. (Term. Pt.)*	±0.4	±0.8
(B.F.S.L.)	±0.25	±0.5
Hysteresis	±0.02	±0.02
Non-Repeatability	±0.05	±0.10

*Includes hysteresis

Stability (F.S./year) ±1.0%

Overpressure:

Proof	10 PSIG/689bar
Burst	50 PSIG/3.45bar

Response time: Less than 250msec

ENVIRONMENTAL EFFECTS

Storage Temperature:	-40/180°F
Operating Temperature:	-20/160°F
(10 - 95% R.H. Non-condensing)	
Compensated Range:	35-135°F

Thermal Coefficients:

	0.5%	1.0%
Zero	±0.015% F.S./°F	±0.02% F.S./°F
Span	±0.015%	±0.02%

Optional thermal compensation at additional cost.

Vibration:

Less than 0.05% F.S. temporary effect with 5g's, 0-60 Hz

Position Effect:

2.0" W.C. and higher	≤ 0.1% F.S.
0.5" - 1.0" W.C.	≤ 0.25% F.S.
0.1" - 0.25" W.C.	≤ 0.4% F.S.

ELECTRICAL

Output Signal:	Power:
4-20 mA (2 wire)	13-36 VDC unregulated
1-5 VDC (3 wire)	12-36 VDC
1-6 VDC (3 wire)	unregulated

Resolution: Infinite

Reverse Wiring Protected

Zero and Span: Externally accessible
Non-interactivePower Supply Effect: ±0.005% F.S./VDC
±0.01% F.S./VDC
(1% unit)

Supply Current:

< 5mA for voltage output

Warm Up Time:

10 sec. max. to meet stated specifications.

PHYSICAL

NEMA 2 Case
Weight: 14 oz.

MATERIALS:

Case: Epoxy coated steel

PRESSURE CONNECTIONS:

Dual barbed, 1/8" and 1/4" Stainless steel

NSTC Shipping qualified

Consult factory for use on other than air
and non-conducting gases.Calibration curve supplied with each
transmitter.

MODEL XLdp

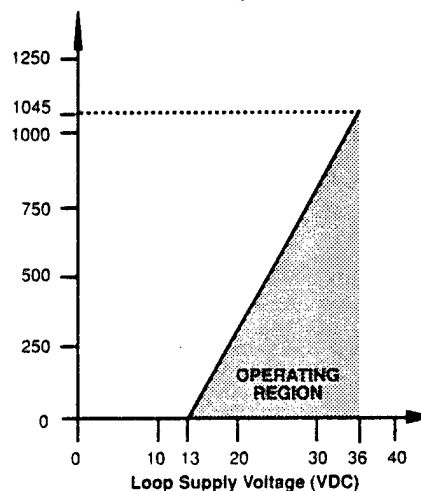
- **Precision fan tracking**
- **Repeatable VAV control**
- **Filter monitoring**
- **Laboratory fume hood control**
- **Lab/clean room pressurization**

- **Precise velocity pressure measurement**
- **Laminar flow measurement**
- **Furnace draft measurement**
- **Oven air flow control**
- **Operating / recovery room pressurization**
- **Leak detection**

4

Figure 1: Dimensions and Connections of the Monitoring Controller. The figure includes two views of the controller: a side view and a top view. The side view shows a height of 1.998 (50.75) and 1.290 (32.8). The top view shows a square footprint with dimensions 4.584 (115.9) and 3.312 (84.1) for the outer frame, and 1.652 (42) for the central area. The overall width is 3.875 (98.4) and 4.195 (108.5). To the right, a wiring diagram shows the 24VDC Power Supply connected to the controller's terminals (+, -, +, -) and a load resistor R_L connected to the Input at Monitoring Controller.

Loop Resistance (Ω) (R_l)



$$V_{\min} = 13V + [.022A \cdot (R_{\text{Loop}})]$$

*includes a 10% safety factor

ASH -

X	L
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Measurement Type
(D) Differential

Compensated Range
(C) 35/135°F

Pressure Connection
(MB2) 1/8 - 1/4 Barbed

Output Signal
(42) 4-20ma
(15) 1/5VDC
(16) 1/6VDC

Supply
(A) 13-36VDC
(B) 12-36VDC
For voltage output

(B) Bidirectional

Pressure Range
"W.C. / mbar
(010) 0.1"W.C./25
(025) 0.25"W.C./1.625
(050) 0.50"W.C./1.25
(100) 1.00"W.C./2.5
(200) 2.00"W.C./5.0
(250) 2.50"W.C./6.25
(300) 3.00"W.C./7.5
(500) 5.00"W.C./12.5
(10X) 10.00"W.C./25.0
(25X) 25.00"W.C./62.5

Model Configuration
(XLdp)

Accuracy
%F.S.
(100) 1.0%
(050) 0.5%
(025) 0.25%

Thermal Error
(N) .02 (1.0%)
(O) .015 (0.5%)

KW AND KWH TRANSDUCERS

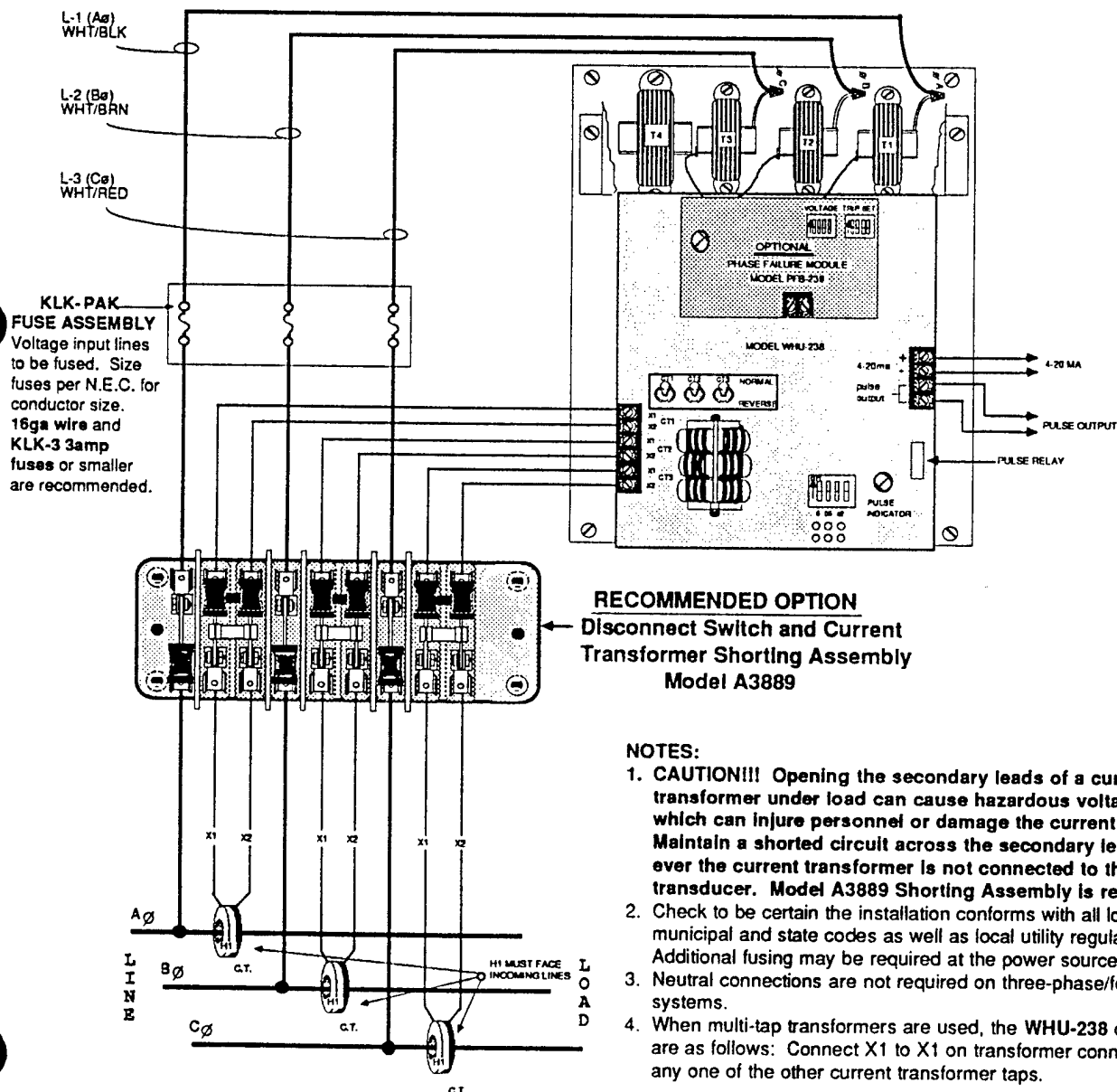
MODEL WHU-238

$$777.78 \times 0.5 = 388.89$$

WIRING

TROUBLE SHOOTING

1. If there is no output or if output from WHU-238 appears incorrect:
 - A. Verify that CT's are installed with "H-1" side facing the incoming power. If a CT is installed backwards, move its respective CT switch in the WHU-238 from the "Normal" to the "Reverse" until the highest 4-20ma output is obtained.
 - B. If this does not correct the problem, verify that the current from each CT is in phase with its respective voltage. For example: If Phase A voltage is wired to "T-1" in the WHU-238, the CT installed on Phase A must be wired to "X-1" and "X-2" at CT-1 input.
 - C. If output from WHU-238 still appears incorrect, re-check calculations for KW demand and KWH/Pulse using equations shown in the Operation section.
2. If 4-20ma (KW) output is correct but there is no pulse (KWH) output, check the pulse indicator LED. If pulse indicator LED is functioning, the pulse relay is defective. Replace the relay. (Part number PRMA-1A05)
3. If the 4-20ma (KW) output is correct but the pulse (KWH) output appears incorrect, check to see that the four dip switches in the WHU-238 are set per Table #1 for the correct pulse rate factor.



KW AND KWH TRANSDUCERS

MODEL WHU-238

OPERATION

3

Calculating Instantaneous Power Demand (KW):

$$\text{Calculate KW DEMAND} = \frac{1.038 \times \text{CT Primary Amps} \times (\text{ma OUT} - 4)}{16}$$

Calculating KWH / Pulse:

$$\text{KWH / Pulse} = \frac{\text{PRF (from TABLE \#1)} \times \text{CT Ratio}^*}{1000}$$

$$^*\text{CT Ratio} = \frac{\text{Current Transformer Primary Amp Rating}}{\text{Current Transformer Secondary Amp Rating}}$$

TABLE #1

SWITCH				WHU-238-A1	WHU-238-A5
1	2	3	4	PRF	PRF
OFF	ON	OFF	OFF	.05	.25
OFF	ON	OFF	ON	.10	.50
ON	OFF	OFF	OFF	.50	2.50
ON	OFF	OFF	ON	1.00	5.00

ORDERING INFORMATION

WHU-238		Basic Model Number 208-240-480-600 V, 3 phase	
<div><div></div><div></div><div></div><div></div></div>	A1	1 amp input from current transformer	
	A5	5 amp input from current transformer	
	Options (leave blank if none required)		
	S	A3889 Shorting Switch (mounted)	
	F	KLK-PAK Fuse Assembly (mounted)	
	B	A3889 and KLK-PAK (mounted)	
W	A3889 and KLK-PAK (mounted and wired)		
	P	PFB-239 Phase Monitor (installed)	

NOTE: Current transformer output must match WHU-238 input

CURRENT OPERATED SWITCHES

$$200 \times 0.5 = 100$$

PD75 SERIES

USE THIS DEVICE TO MONITOR AC CURRENTS AND TO SWITCH DC CIRCUITS

3

DESCRIPTION

PD75 Series Precision Solid-state Switches operate when the AC current level sensed by the internal current transformer exceeds the threshold values set by the four-turn adjustments. Three selectable ranges offer optimum adjustability and resolution. Internal circuits are totally powered by induction from the line being monitored.

These switches monitor loads which may vary slowly about the setpoint and where switching must be fast and precise. See the Model D150 for relatively fixed loads where reliable ON/OFF indication or control is needed at lowest cost.

FEATURES

- Self-powered
- Small size
- Wide current range
- Solid-state reliability
- Simple adjustment
- Low cost
- UL recognized
- CSA certified
- See PD50AC Series page after next



SPECIFICATIONS

Operating temperature: -58° to 149°F (-50° to 65°C) Case: ABS (Meets UL flammability rating 94V-0)

MONITORED AC CURRENT:

INPUT RANGE	JUMPER	MAX. CONTINUOUS	6 SEC'S	1 SECOND
1-6 amps	None	60 amps	100 amps	175 amps
6-30 amps	Mid	100 amps	150 amps	300 amps for 1 Sec. Monitor motors in this range up to 50 FLA.*
30-150 amps	High	160 amps	350 amps	500 amps for 1 Sec. Monitor motors in this range up to 85 FLA.*

* NOTE: For motors with higher FLA's and/or longer start times, and for larger diameter conductors, use an external current transformer whose secondary current flows thru the sensor.

Switching Capability: 150ma continuous, 500ma momentary, 30VDC.

SWITCHING CHARACTERISTICS

	LOW RANGE		MID RANGE		HIGH RANGE	
AMP INPUT:	1A.	6A.	6A.	30A.	30A.	150A.
HYSTERESIS:	.02A.	.7A.	.24A.	1.8A.	1.3A.	10A.
RESPONSE TIMES: (with sensor set to ranges and values above and current thru sensor 5% above trip point)						
ON delays	140ms.	110ms.	60ms.	40ms.	30ms.	30ms.
OFF delays	80ms.	40ms.	70ms.	50ms.	70ms.	40ms.

CURRENT OPERATED SWITCHES

PD75 SERIES

APPLICATION

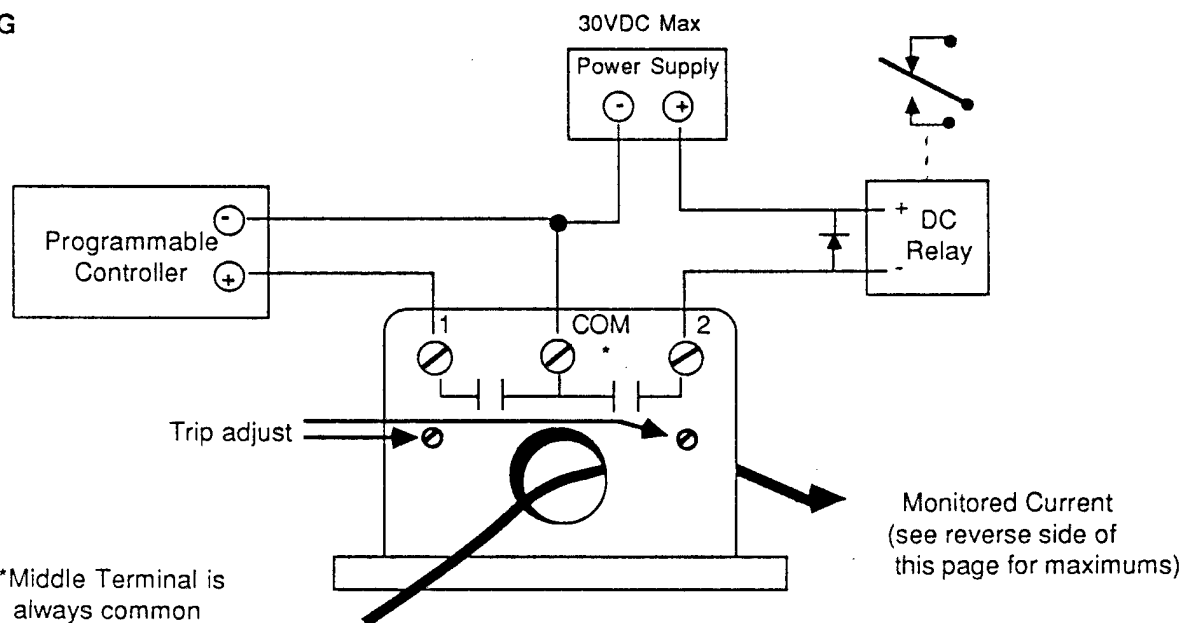
3

- Precision switching
- Direct connection to PC's with DC Inputs, for general status and proof-of-performance monitoring
- Directly control light DC loads, such as lamps and relays, in response to the current of a monitored AC circuit
- Replace differential pressure and air flow switches
- Safety and alarm circuits
- Monitor motors for broken belts and couplings
- Heat tracing, heater monitoring

DIMENSIONS

Units are 2 1/8"H x 2 1/8"W x 1"D, with an integral mounting base 3 1/4" long and mounting centers of 2 3/4". Two holes are provided on one side to accept #6 screws, for alternate mounting. The thru-hole is .55" diameter, for up to #2/0 insulated wire (THHN, THWN type insulation).

WIRING



ORDERING INFORMATION

Normally - Open (1 Form A): Model PD75-1

Normally - Open (2 Form A): Model PD75-2

PLATINUM TEMPERATURE SENSOR

MODELS RTS-5737-G / RTS-5737-W / RTS-5737-K

DESCRIPTION

Hy-Cal's Room, Duct, and Outside Air Temperature Sensors are designed for energy and environmental control applications. These sensors use a thin film platinum element for fast, accurate point measurement.

The RTS-5737-K is available in a decorative wall mount housing to provide a pleasant, professional appearance. This housing can either flush mount, or mount directly over a standard handi box.

The RTS-5737-G features a rugged, stainless steel probe mounted in a standard handi box, making installation quick and easy with self-tapping screws.

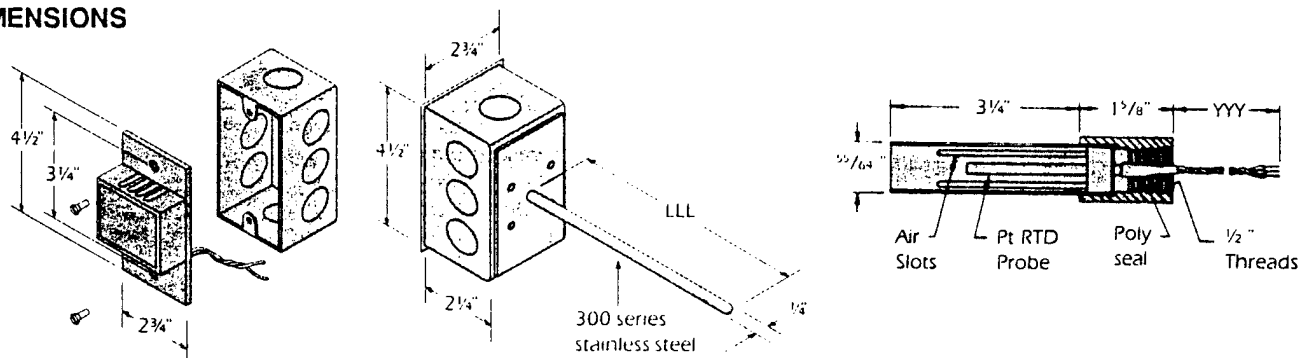
The RTS-5737-W features a non-heat conductive, solar reflecting, non-corrosive shield. This configuration is completely sealed against moisture in weather conditions. The slotted shield allows air to flow freely to the stainless steel probe, to provide accurate measurement. Installation is made easy with a 1/2" female thread for mounting on the end of a conduit, or a "U" bolt can be used for flush mounting.



	SENSOR	SPACE	DUCT	WATER	OAS
FEATURES		69.83	91.67	166.25	91.67
	TRANS	248.61	248.61	248.61	248.61
		318.44	340.28	414.86	340.28
		X 0.5	X 0.5	X 0.5	X 0.5
		159.22	170.14	207.43	170.14

- Low cost, easy installation
- Rugged design
- Platinum RTD's
- Interchangeable sensors

DIMENSIONS



1 PLATINUM TEMPERATURE SENSOR

MODELS RTS-5737-G / RTS-5737-W / RTS-5737-K

SPECIFICATIONS

Temperature range	RTS-5737-G;	-50°C to +260°C (-58°F to +500°F)	Interchangeability	All others; $\pm 0.5^\circ\text{C}$ or 0.8% of temp. at $\pm 0.2\%$ R_0 trim $\pm 0.3^\circ\text{C}$ or 0.6% of temp. at $\pm 0.1\%$ R_0 trim optional
	RTS-5737-W;	-50°C to +80°C (-58°F to +176°F); limited by housing		
	RTS-5737-K;	-50°C to +65°C (-58°F to +150°F); limited by housing	Stability	Better than $.05^\circ\text{C}$ per year
Sensing element			Insulation resistance	>50 megohms at 50 VDC at 25°C
			Maximum current	2 ma
Ice point resistance, R_0			Recommended current	1 ma
			Probe material & diameter	RTS-5737-G; stainless steel, 1/4" dia. RTS-5737-W; 300 series stainless steel body, 1/4" dia. RTS-5737-K; high purity alumina, 3/16" dia.
Time constant, air at 10 ft./sec.	RTS-5737-G;	3 minutes	Housing material	RTS-5737-G; electro-zinc plated RTS-5737-W; white polyvinyl chloride RTS-5737-K; beige thermoplastic
	RTS-5737-W;	3 minutes	Lead wire material	24 ga. nickel coated stranded copper, Teflon insulated
Self heating	RTS-5737-K;	3 minutes		
	Typically > 15 mW/ $^\circ\text{C}$			

ORDERING INFORMATION

Basic Model	Description
RTS-5737-W	Outdoor Air Temperature Probe (Omit Code 2)
RTS-5737-G	Air duct probe (Omit Code 2)
RTS-5737-K	Room mount air temperature sensor (Omit Code 2 & 5)
Code 1	Temperature Coefficient
	T 385 platinum 100 Ohm, 0.00385 Ohm/Ohm/ $^\circ\text{C}$ DIN specification U 375 Platinum 1000 Ohm thin film 0.00375 Ohm/Ohm/ $^\circ\text{C}$ ULTRA-7
Code 2	Probe Length - "LLL"
	" Specify in inches - RTS-5737-G only (8" standard)
Code 3	Lead Wire Configuration
	2 2-wire (standard) 3 3-wire (available)
Code 4	Lead Length
	" Specify in inches (6" standard on all except 18" on RTS-5737-W)
Code 5	Housings (optional)
	H15 Handy box with 3/4" knockouts (RTS-5737-G only)
	H16 Handy box with 1/2" knockouts (RTS-5737-G only)
	H19* Weatherproof housing with 1/2" female threaded outlets (RTS-5737-W only)
Code 6	Options
	X1 Interchangeability 0.1% at 0°C (Not available on RTS-4205-P) X55 Signal conditioning matched to probe ice point

*Supplied with close nipple for connection with RTS-5737-W

IMMERSION PROBES / SURFACE SENSORS

1

MODELS RTS-5737-P/ RTS-5737-V

DESCRIPTION

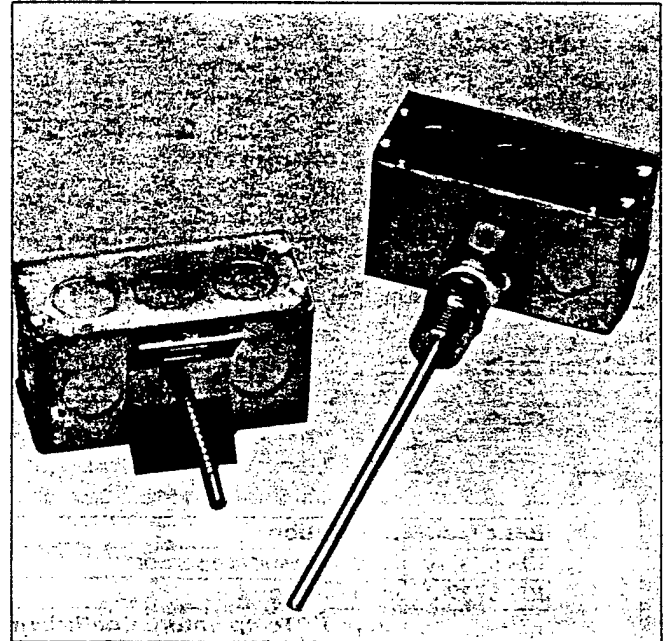
For energy control application requiring accurate temperature measurement of contained liquids or gases, Hy-Cal has designed several cost-effective immersion probes and non-intrusive sensors.

Hy-Cal's Immersion Probes are designed with a 1/2" tapered thread for easy installation in thermowells, standard pipe fittings or threaded bosses.

Hy-Cal welds and anchors the sensor leads in an alumina sheath using thermally matched proprietary cements. Immersion probe elements are then assembled into a close tolerance stainless steel tube, injected with heat transfer paste and packed with magnesium oxide. This provides an extremely stable and durable probe.

Where penetration of the container or pipe is not practical, strap-on or surface sensors are available. These sensors measure the temperature of the surface of the pipe or container. Properly installed and insulated from ambient conditions, this method provides reasonable temperature measurement.

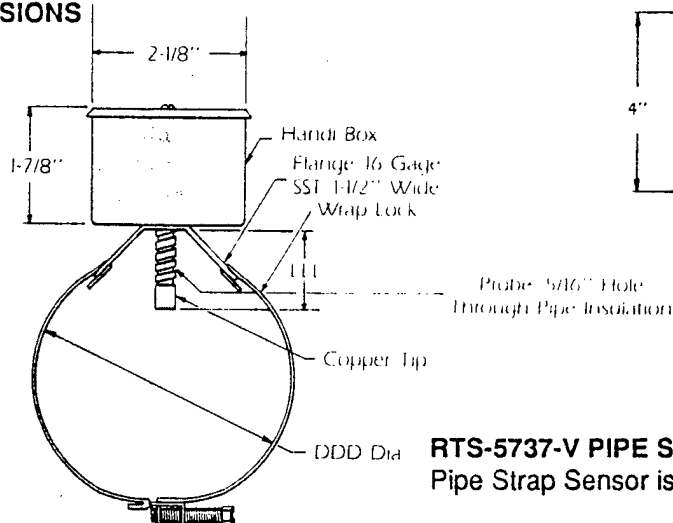
For those applications that require replacing the sensor without recalibration of the electronics, the X1 Option is recommended. This yields a tighter trim of the resistance value at ice point, making recalibration of the electronics unnecessary.



FEATURES

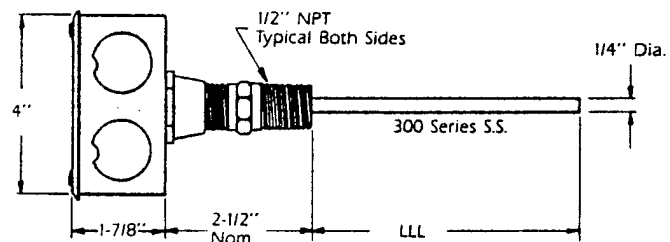
- *Low cost, easy installation*
- *Rugged construction*
- *Immersion probes and non-intrusive sensors*
- *Interchangeability*

DIMENSIONS



RTS-5737-V PIPE STRAP

Pipe Strap Sensor is mounted in a handi box.



RTS-5737-P IMMERSION PROBE
RTS-5737-P is a thin film Immersion Probe mounted in a handi box.

IMMERSION PROBES / SURFACE SENSORS

MODELS RTS-5737-P / RTS-5737-V

SPECIFICATIONS

Temperature range	-320° to 500°F (-200° to 260°C)	Interchangeability	±.5°C or 0.8% of temp. at ±0.2% R_0 trim;
Sensing element	385 Platinum .00385 $\Omega/\Omega/^\circ\text{C}$ 375 Platinum .00375 $\Omega/\Omega/^\circ\text{C}$		±.3°C or 0.6% of temp. at ±0.1% R_0 trim optional
Ice point resistance, R_0	1000 ohm only 100 ± 0.2 Ω (±0.2%); ±0.1 Ω (0.1%) optional 1000 ± 0.2 Ω (±0.2%); ±0.1 Ω (±0.1%) optional	Maximum current	2ma
Self heating	Typically > 15mW/°C	Recommended current	1ma
Stability	Better than .25°C per year	Probe material & diameter	RTS-5737-P: stainless steel body RTS-5737-V: copper tipped stainless steel body
Insulation resistance	>50 megohms at 50VDC at 25°C	Lead material	Nickel-coated stranded copper, Teflon insulated; all others: 24 GA

ORDERING INFORMATION

Basic Model	Description
RTS-5737-V	Pipe strap surface sensor
RTS-5737-P	Immersion probe
	Code 1 Temperature Coefficient
T	385 platinum thin film, 100 Ω ; .00385 $\Omega/\Omega/^\circ\text{C}$ DIN specification
U	375 platinum thin film, 1000 Ω ; ULTRA-7™, .00375 $\Omega/\Omega/^\circ\text{C}$
	Code 2 Resistance at ice point (R_0)
100	100 ± 0.2 Ω (Thin film)
1000	1000 ± 2.0 Ω (ULTRA-7™ thin film)
	Code 3 Immersion Length ("LLL")
	Specify in inches (2" minimum)
	Code 4 Lead Wire Configuration
2	2-Wire; standard
3	3-Wire available
	Code 5 Lead Wire Length ("YYY")
	Specify in inches (6" standard)
	Code 6 Options
X1	Interchangeability 0.1% @ 0°C
X15	Type 316 S.S. probe tube
X55	Signal conditioning matched to ordered probe at Ice Point
H15	Handy box with 3/4" knockouts (RTS-5737-P only)
H16	Handy box with 1/2" knockouts (RTS-5737-P only)
H19*	Weatherproof utility box (RTS-5737-P & RTS-5737-V only)

* For RTS-5737-P-U-1000-LLL-2-6 when ordered with a CT-809 rangeable transmitter, the H19 weatherproof box is included with the transmitter. No box is required with the probe. X55 option is recommended to provide ice point calibration for accurate matching to any range.

PLATINUM 1000Ω SPACE TEMPERATURE TRANSMITTER

MODEL CT-859

DESCRIPTION

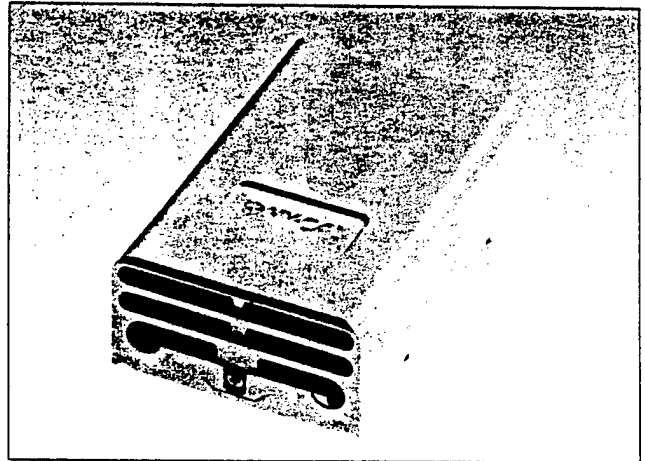
The CT-859 is a Dip Switch Rangeable Room Temperature Transmitter. The unit features wide rangeability and stable performance. Non-interacting vernier multi-turn controls provide a constant resolution adjustment. Gold plated dip switches ensure stable overlapping incremental selections between -10° and 60°F for zero and 35° to 150°F for span.

The maximum ventilation design derived from extensive development testing enhances sensor response and ensures excellent dissipation of heat from the circuit.

Repeatability is excellent because the CT-859 uses a Platinum RTD as the sensing element. Calibrated system accuracy of the CT-859 is typically 0.25°F.

Once installed, the cover does not need to be removed for field calibration or on-line verification. A jack is accessible through the cover where the Hy-Cal Model SA-728-A Field Calibration Meter plugs in for direct 0-100% of scale reading.

Calibration is performed by plugging in a meter, comparing it to a portable standard, adjusting one pot, unplugging the meter and walking away. The cover stays on for on-line accuracy verification. A calibrated 4.0ma ±0.01ma is provided when the sensor leads are shorted. This is a "zero" reference to aid in installation and set-up. The two transmitter loop leads are insensitive to power supply polarity. This prevents reversed hook-ups and simplifies installation.



FEATURES

- *Unique wall mount housing*
- *Optimum flow-through ventilation*
- *Easy zero & span ranging*
- *Exclusive walk-up plug-in readout*
- *On-line calibration*
- *Calibrated system test current*
- *Non-polar connections*

SPECIFICATIONS

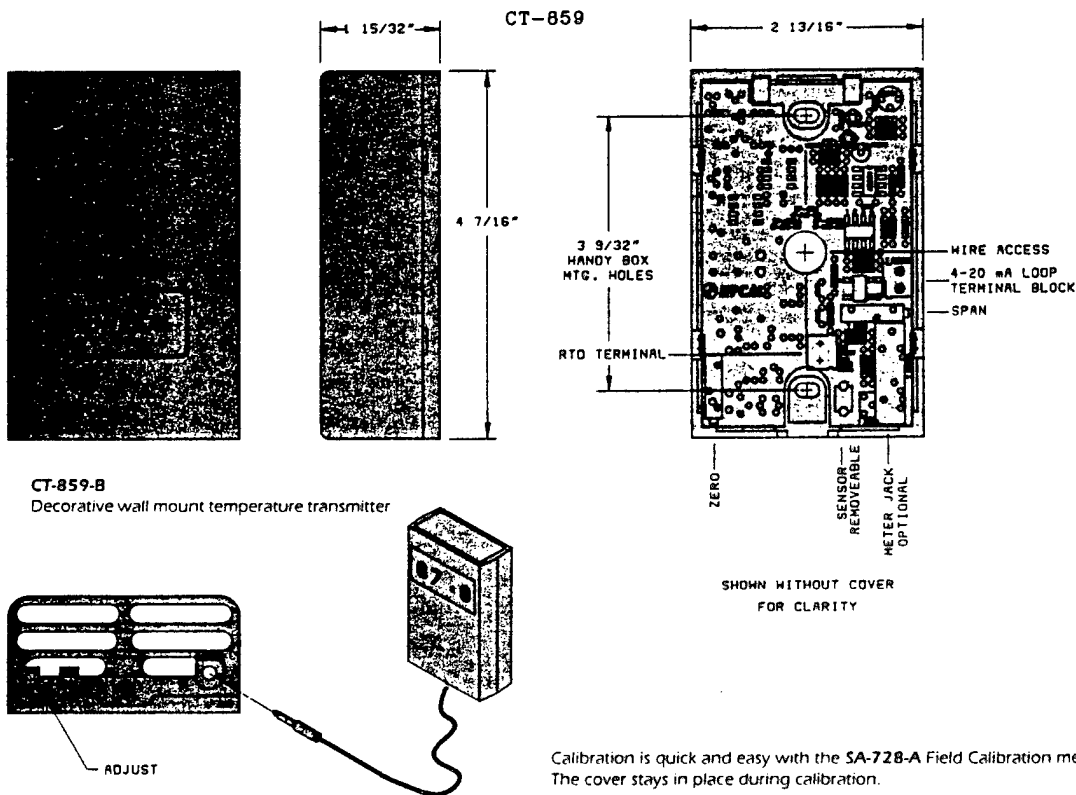
Sensing element	Ultra-7™ 1000 ohm platinum RTD	Recommended
System accuracy	±0.5°F (0.3°C) at room temperature or ±0.8% of span operating at 24VDC; Optional sensor matching provides ±0.25°F (±0.14°C) at room temp.	R_{load} 100 ohms ±0.1% at 11.4VDC minimum; 250 ohms ±0.1% at 14.4VDC minimum; 500 ohms ±0.1% at 19.4VDC minimum; add 2.7 volts for operations with SA-728-A Meter.
Rangeability	Zero: -10° to 60°F (-23° to 15°C) Span: 35° to 150°F (19° to 83°C) Gold plated dip switch selected 4-20ma, 2-wire	Connections Screw terminals. Non-polar, connect either way
Output Transmitter		SERVICEABILITY:
linearity	±0.05% of span (negligible) Included in system accuracy	Periodic
Sensor stability	Better than 0.09°F (0.05°C) per year	maintenance Integral receptacle for plug-in local SA-728-A Indicator permits on-site calibration to a transfer standard
INSTALLATION:		Vernier zero &
Transmitter		span adjust Zero and span adjust non-interacting. Resolution is constant and is in- dependent of dip switch range selection. Adjust zero only for on-site calibration.
housing	Style "MH" - 4 7/16"H x 2 13/16"W x 1 3/8"D, ABS housing.	
Operating/storage		
temperature	-58° to 150°F (-50° to 66°C)	
Power supply		
sizing	9.4VDC + (R _{load} x 0.02A) minimum, 45VDC maximum, unregulated. Add 2.7 volts for operations with SA-728-A Meter.	

Specifications subject to change without notice.

PLATINUM 1000 Ω SPACE TEMPERATURE TRANSMITTER

MODEL CT-859

WIRING / DIMENSIONS



ORDERING INFORMATION

CT-859-B Space Temperature Transmitter with Sensor

Basic Model	Description
CT-859-B	2-Wire, 4-20 mA Space Temperature Transmitter with Platinum RTD sensor
Code 1	Temperature Range (100% re-rangeable)
(Range)	Specify range in either °F or °C; e.g. (30/130°F)
(40/90°F)	Stock range
Code 2	Options
X5	Transmitter Matched to Sensor Ice Point

Basic Model	Description
SA-728-A	Hand held loop powered digital meter

1000 ohm PLATINUM RTD SENSORS & TRANSMITTERS

TYPE 91

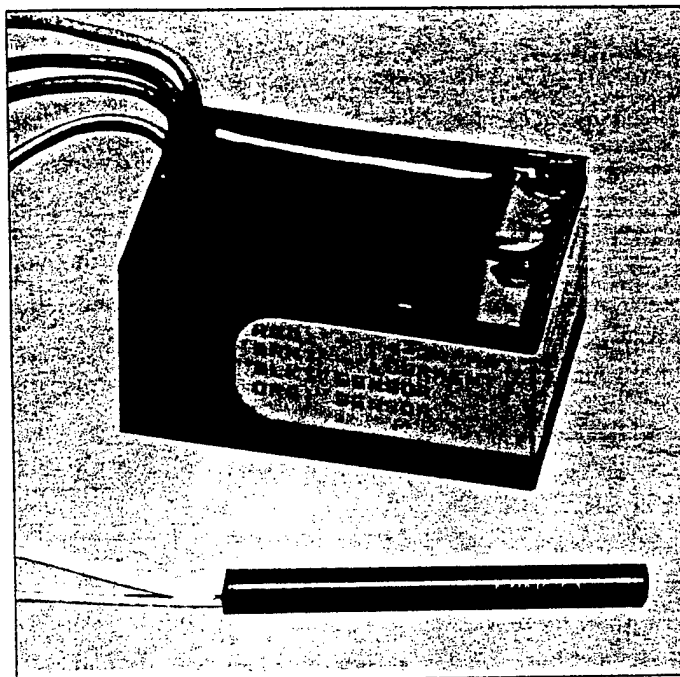
DESCRIPTION

The Type 91 Platinum Wirewound RTD Sensors by Minco are designed to meet the requirements of commercial HVAC applications. These sensors are placed in room enclosures or stainless steel probes as required to monitor duct, water, or outdoor air. Temperatures over the range of -20° to 240°F may be monitored.

Temptran™ Transmitters provide signal conditioning where remote temperature measurements or 4-20ma temperature signals are required.

SPECIFICATIONS

SENSOR	1000 ohms @ 0°C ± .2% (TCR) .00375
TRANSMITTER	4-20ma ± .1 % of temperature span



ORDERING INFORMATION

TYPE 91/1000 ohm PLATINUM SENSORS AND TRANSMITTERS

MODEL	TYPE
ST-S91P	Space
ST-S91E	Space
ST-S91	Space
ST-D91	Duct
① ST-AV91	Averaging
ST-W91	Water*
ST-O91	OSA
ST-R91	Raw Sensor

MODEL	TYPE
M91T-30240	Transmitter** 30° to 240°F
M91T-20140	Transmitter** -20° to 140°F
M91T-32122	Transmitter** 32° to 122°F

Sensors are 1000 ohm 375 Platinum

* Includes Brass Thermowell

** Special Ranges Available

① Sensor is Continuous Resistance Element

See Index for complete Temperature
Sensing Assemblies using Minco Sensing Elements.

PLATINUM CURVE AVERAGING SENSORS

SENSOR $233.75 \times 0.5 = 116.88$
 TRANSMITTER $166.67 \times 0.5 = 58.33$
\$175.21

MODEL ST-AV81 / ST-AV91

DESCRIPTION

Bendable Area Averaging Sensors

These continuous resistance element Averaging Sensors provide accurate sensing of duct temperatures when a large area must be covered. They average temperatures over their entire lengths thus avoiding point measurement errors.

The Averaging Sensors use a proprietary Minco Sensing Element that closely matches platinum resistance/temperature characteristics over the specified range of -30° to +240°F.

The sensors have a copper case which is bendable to a radius of 4". They can crisscross a duct or plenum to average out temperature stratification in both directions.

SPECIFICATIONS

TYPE 81/100 ohm AVERAGING SENSORS

SENSOR 100 ohms @ 0°C ± 5%
(TCR) .00385

TYPE 91/1000 ohm AVERAGING SENSORS

SENSOR 1000 ohms @ 0°C ± 5%
(TCR) .00375

TRANSMITTER 4-20ma ± 1% of temperature span
(Refer to index for M81T or M91T Transmitters for more information.)

TEMPERATURE AVERAGING
SENSORBENDABLE
SENSOR

ORDERING INFORMATION

Model	Description
ST-AV	AVERAGING DUCT SENSOR
81	100 ohm 385 Platinum Sensor, 20 feet long
91	1000 ohm 375 Platinum Sensor, 20 feet long
ST-AV - 81	Averaging Duct Sensor 100 ohm 385 Platinum, 20 feet long

HIGH TEMPERATURE SENSOR AND TRANSMITTER

MODELS S241HT / TT111-0800

\$275 X 0.5 = \$137.5

DESCRIPTION

The Model S241HT is a direct insertion type, High Temperature Sensor which is used to monitor the temperature of boiler stacks, steam lines, and other applications where the temperature may rise above the operating range of standard sensors. When used with the TT111-0800 Transmitter, a 4-20ma output is provided which is linear from 0 to 800°F.

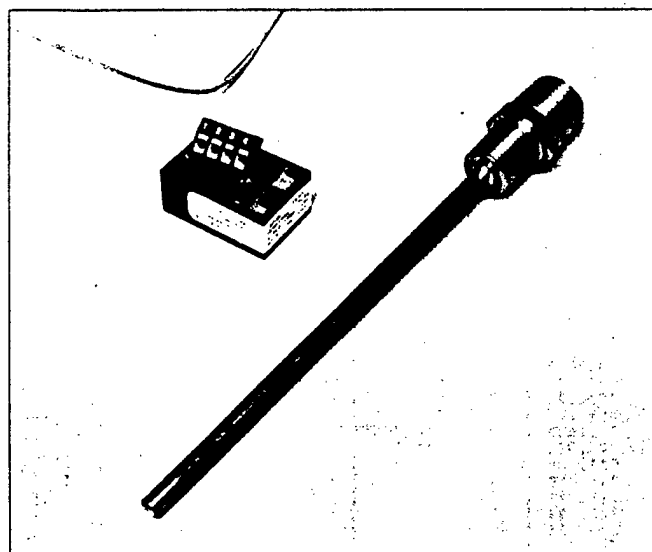
SPECIFICATIONS

SENSOR:

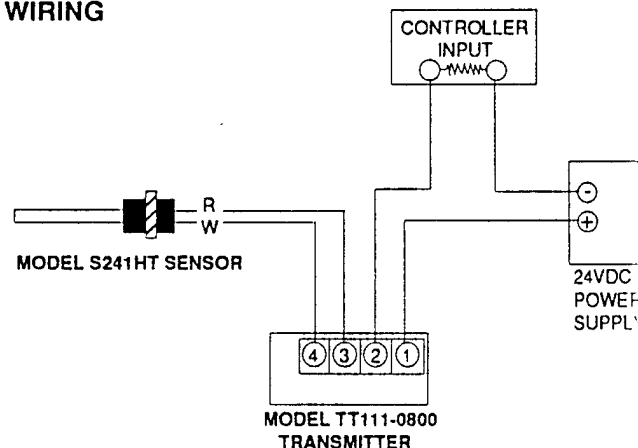
Resistance	100Ω ±0.1% @32°F (0°C)
Temp. coefficient	.00391Ω/Ω°C
Temp. range	-148° to 850°F (-100° to 454°C)
Leads	AWG #22, stranded nickel-clad copper with glass braid insulation 24" long
Working pressure	2500 PSI@ 77°F (25°C) 1000 PSI@ 850°F (454°C)
Construction	Probe - 316 stainless steel Threaded fitting - 416 stainless steel Element - chemically pure platinum wire

TRANSMITTER:

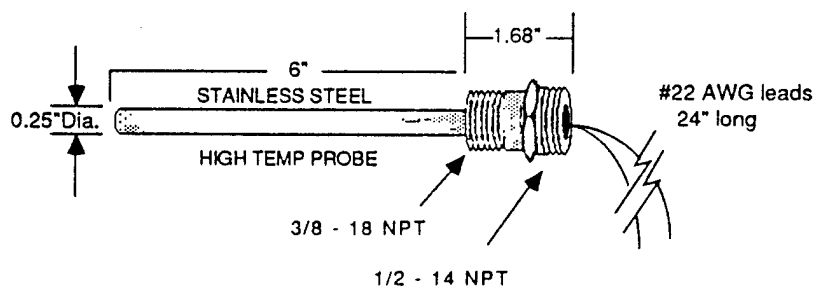
Input	100Ω platinum .00391Ω/Ω°C
Output range	4-20ma/0° to 800°F (-18° to 427°C)
Ambient temp. range	32° to 122°F (0° to 50°C)
Storage temp. range	-67° to 212°F (-55° to 100°C)
Supply voltage	24VDC
Accuracy	±0.31%
Loop resistance	750Ω maximum



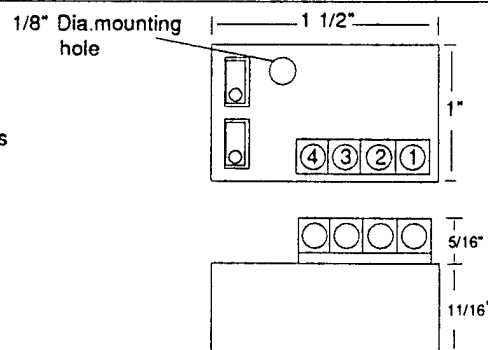
WIRING



DIMENSIONS



MODEL S241HT SENSOR



MODEL TT111-0800 TRANSMITTER

ORDERING INFORMATION

S241HT - Direct Insertion High Temperature Sensor
 TT111-0800 - High Temperature Transmitter, 0 to 800°F, 4-20ma

PLATINUM / BALCO RTD ROOM SENSORS

SPACE

97.22

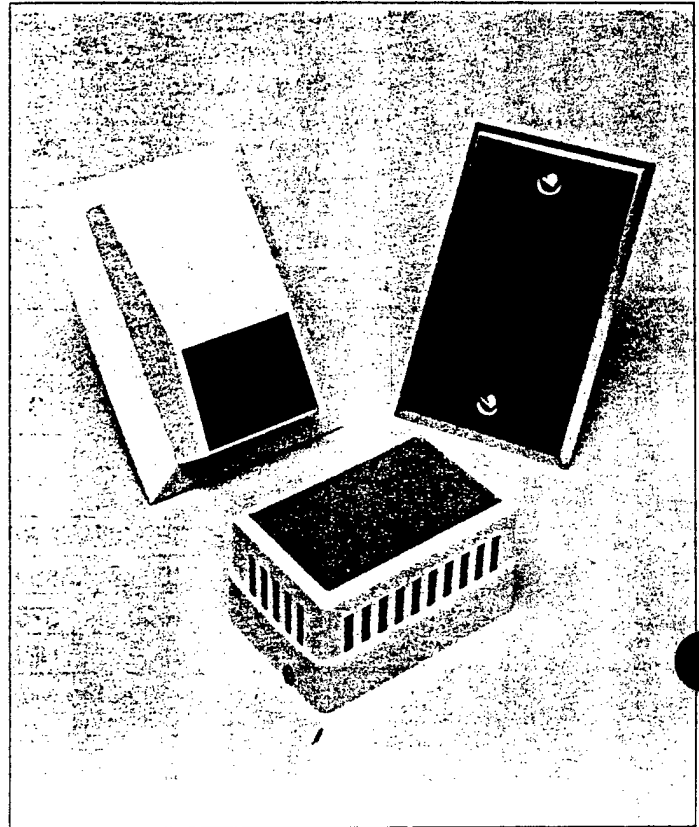
SENSOR ~~65.97~~ $\times 0.5 = 32.99$ 48.61
X-MITTER $166.67 \times 0.5 = 83.33$

MODEL ST-S

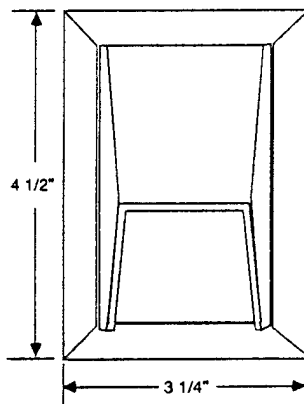
116.32 131.94

DESCRIPTION

MINCO Wirewound RTD Sensors are used to provide reliable accurate temperature readings in surface mount room environments. The room sensors feature: a stainless steel insulated plate; a standard plastic ventilated enclosure; and a deluxe executive enclosure design. The stainless steel plate is ideal for areas of vandalism or where the sensor can be easily knocked off the wall. The sensors are designed for interior use only in the temperature range of -30° to 100°F.

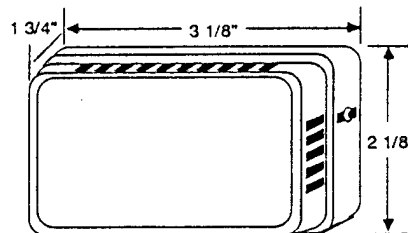


DIMENSIONS



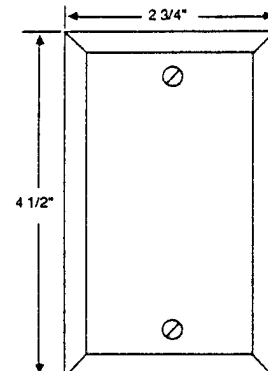
Toggle bolts or other direct wall mount screws can be used where conduit is not required. Adapters are not required when mounting directly to electrical outlet boxes.

**EXECUTIVE
ST-SXXE**



Horizontal or vertical mounting is permitted. Toggle bolts or other direct wall mount screws can be used where conduit is not required.

**STANDARD
ST-SXXP**



Horizontal or vertical mounting is permitted. The 6-32 screws supplied fit standard electrical boxes. Toggle bolts or other direct wall mount screws can be used where conduit is not required. Tighten down mounting screws, crushing foam gasketing, until plate edges just touch wall.

**STAINLESS STEEL
ST-SXX**

PLATINUM / BALCO RTD ROOM SENSORS

MODEL ST-S

SPECIFICATIONS

TYPE 81/100 ohm PLATINUM SENSORS

SENSOR 100 ohms @ 0°C ± .2%
(TCR) .00385

TYPE 91/1000 ohm PLATINUM SENSORS

SENSOR 1000 ohms @ 0°C ± .2%
(TCR) .00375

TYPE 77/1000 ohm BALCO RTD SENSORS

SENSOR 1000 ohms @ 70°F ± .5°F
(TCR) .00527

TYPE 78/2000 ohm BALCO RTD SENSORS

SENSOR 2000 ohms @ 70°F ± .5°F
(TCR) .00527

TRANSMITTER 4-20ma ± .1% of
temperature span

SEE INDEX FOR MODEL
M77T TRANSMITTER INFORMATION

ORDERING INFORMATION

Model	Description
ST-S	SURFACE MOUNT ROOM SENSOR
81	100 ohm 385 Platinum Sensor
91	1000 ohm 375 Platinum Sensor
77	1000 ohm Nickel / Iron / Balco 2.48 ohms / °F Sensor
78	2000 ohm Nickel / Iron / Balco 4.96 ohms / °F Sensor
P	Plastic Ventilated Room Enclosure
E	Executive Style Room Enclosure
-	Stainless Steel Plate - No Code Required

ST-S	-	81	-		Surface Mount 100 ohm 385 Platinum Room Sensor, stainless steel plate
------	---	----	---	--	--

1 1000 ohm & 2000 ohm BALCO RTD SENSORS & TRANSMITTERS

TYPE 77 (1000 ohm) / TYPE 78 (2000 ohm)

DESCRIPTION: TYPE 77

The Type 77 Balco Wirewound RTD Sensors by Minco are designed to meet the requirements of commercial HVAC applications. These sensors are placed in room enclosures or stainless steel probes as required to monitor duct, water, or outdoor air. Temperatures over the range of -30° to 240°F may be monitored.

Temptran™ Transmitters provide signal conditioning where remote temperature measurements or 4-20ma temperature signals are required.

SPECIFICATIONS

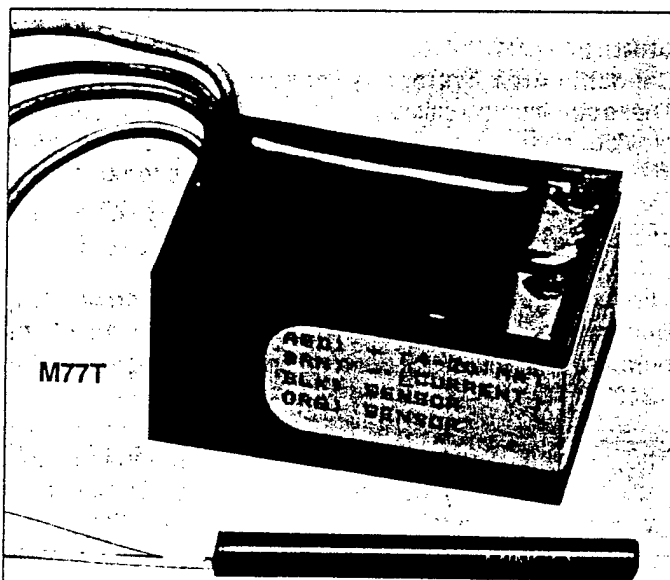
SENSOR	1000 ohms @ 70°F ± .5°F (TCR).00527
TRANSMITTER	4-20ma ± .1 % of temperature span

DESCRIPTION: TYPE 78

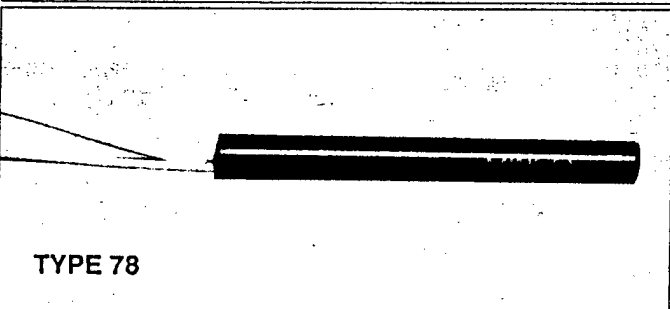
The Type 78 Balco Wirewound RTD Sensors by Minco are designed to meet the requirements of commercial HVAC applications. These sensors are placed in room enclosures or stainless steel probes as required to monitor duct, water, or outdoor air. Temperatures over the range of -30° to 240°F may be monitored.

SPECIFICATIONS

SENSOR	2000 ohms @ 70°F ± .5°F (TCR).00527
--------	--



TYPE 77



TYPE 78

ORDERING INFORMATION

TYPE 77/1000 ohm RTD SENSORS AND TRANSMITTERS

MODEL	TYPE
ST-S77P	Space
ST-S77E	Space
ST-S77	Space
ST-A77	All Purpose
ST-D77	Duct
ST-W77	Water*
ST-077	OSA
ST-R77	Raw Sensor
M77T-30130	Transmitter -30° to 130°F
M77T-30240	Transmitter 30° to 240°F

* Includes Brass Thermowell

TYPE 78/2000 ohm RTD SENSORS

MODEL	TYPE
ST-S78P	Space
ST-S78E	Space
ST-S78	Space
ST-A78	All Purpose
ST-D78	Duct
ST-W78	Water*
ST-078	OSA
ST-R78	Raw Sensor

* Includes Brass Thermowell

SEE INDEX FOR
COMPLETE TEMPERATURE
SENSING ASSEMBLIES USING
MINCO SENSING ELEMENTS.

OPTIONS FOR AVERAGING TUBE FLOW SENSORS

POSITION SENSOR

Model	Description	List	Code
130-PC-00-00	DIFFERENTIAL PRESSURE GAUGE	713.89	A
VERTICAL	FOR INSTALLATION IN VERTICAL PIPE (301 SERIES)	147.22	A
SECURITY CHAIN	301 SERIES ONLY	33.33	A
ALL316SS	301 SERIES ONLY	138.89	A

FLOW METERS*

• HERSEY

MODEL V	TARGET TYPE	CALL KELE & ASSOCIATES FOR PRICING INFORMATION REQUIRED: 1. Fluid to be metered 2. Operating pressure 3. Max flow (GPM, lbs/hr, SCFM, etc.) 4. Pipe size and type 5. Operating temperature
MODEL VS	TARGET TYPE FOR STEAM	
MODEL TW	SIGNAL TRANSMITTER	
MODEL 1050	LINEAR SIGNAL TRANSMITTER	
MODEL 1200	FLOW RATE INDICATOR AND TOTALIZER	
MODEL 1500	MASS FLOW COMPUTER	
* Non-stock items		

TURBINE*

• NUTATING DISC

MTX	TURBINE WATER METER	CALL KELE & ASSOCIATES FOR PRICING INFORMATION REQUIRED: 1. Fluid to be metered 2. Operating pressure 3. Max flow (GPM, lbs/hr, SCFM, etc.) 4. Pipe size and type 5. Operating temperature
WPX	TURBINE WATER METER	
REGISTERS	VARIOUS TYPES	
1010	DIGITAL FLOW RATE INDICATOR	
1020	DIGITAL FLOW RATE INDICATOR / TOTALIZER	
* Non-stock items		

SPECIALTY SENSORS

Model	Description	Output	List	Code
A70-SL	WIND SPEED	4-20ma	750.01	A
A70-DL	WIND DIRECTION	4-20ma	1041.68	A
A70-PL	BAROMETRIC PRESSURE	4-20ma	1041.68	A
A70-SDL	WIND SPEED, DIRECTION	4-20ma	1791.68	A
A70-SDPL	WIND SPEED, DIRECTION, BAROMETRIC PRESSURE	4-20ma	2763.91	A
501	VIBRATION SWITCH, 1 LIMIT	NO OR NC SWITCH	972.23	A
502	VIBRATION SWITCH, 2 LIMITS	2-NO OR NC SWITCHES	1097.23	A
191-1	VIBRATION TRANSMTR., 0-1in/sec	4-20ma	694.45	A
191-2	VIBRATION TRANSMTR., 0-2in/sec	4-20ma	694.45	A
WCO-1	CO SENSOR	4-20ma	972.23	A
CM-FCK	CO FIELD CALIBRATION KIT	4-20ma	377.78	A
CD-D	CO2 DUCT SENSOR	4-20ma	1875.02	A
CD-W	CO2 SPACE SENSOR	4-20ma	1875.02	A
WSP-X"	WATER LEVEL SENSOR	4-20ma	220.84	A
	"X" = LENGTH IN INCHES - ADD PER FT.		15.97	A
PH-7615-1	PH SENSOR	4-20ma	1836.13	A
C-7615-1	CONDUCTIVITY SENSOR	4-20ma	1625.01	A
PQ1001-3	DAMPER POSITION INDICATOR	RESISTANCE	152.78	A
PQ1001-3-VTI-1	DAMPER POSITION INDICATOR	4-20ma	272.22	A
WD-1	WATER DETECTOR	SPDT SWITCH	216.67	A
#802	COMPRESSOR FOR BUBBLER	4 PSIG MAX	52.78	A
400-1911	COMPRESSOR FOR BUBBLER	18 PSIG MAX	330.55	A

All purchases are subject to Kele & Associates standard terms of sale.
P.O. Box 34817 / Memphis, TN 38184 / 901-382-4300 / FAX 901-372-2531

→ 0.5 136.11

CUTLER-HAMMER CONTROL COMPONENTS

Auxiliary Contacts Non-Reversing Contactors and Starters

A10, A11, A13, A30, A31, A40, A41, B10, B11, C10 AND C30

FILE

C320

DESCRIPTION

Size 00 devices have one NO contact built into the contactor frame. Size 0-5 devices are provided with a NO base auxiliary contact in position L1. Size 6 devices have

2 NO-2 NC contacts mounted in position L1. Size 7 & 8 devices are provided with NO-NC contacts in position L1.

AUXILIARY CONTACTS — SIZE 00

Mounting Position	Circuits	Catalog Number	Kit Price
Front (See Sketch Below) Open and Enclosed Types	2 NO	MC320KE20	\$32.00
	2 NC	KE02	32.
	1 NO & 1 NC	KE11	32.
	1 NO & 1 NC Late Break	KE11L	32.
	4 NO	KE40	64.
	3 NO & 1 NC	KE31	64.
	2 NO & 2 NC	KE22	64.
	2 NO & 2 NC Late Break	KE22L	64.

AUXILIARY CONTACTS — SIZES 0-5

Auxiliary Contacts - Sizes 0-5					
Circuit	Available Mounting Positions (See Sketch Below for Position Designations)			Catalog Number	Kit Price
	Open Types Sizes 0-5	Enclosed Types			
		Sizes 0 & 1	Sizes 2-5		
NO	L2, L3, R2, R3	L2, L3	L2, L3, R2, R3	C320KA1 KA2 KA3	\$24.
NC	L2, L3, R2, R3	L2, L3	L2, L3, R2, R3		24.
① NO-NC	L2 & L3, R2 & R3	L2 & L3	L2 & L3, R2 & R3		32.

BASE AUXILIARY CONTACTS — SIZES 0-5

Circuit	Open Types — Sizes 0-5	Catalog Numbers ③			Kit Price
	Enclosed Types — Sizes 2-5	Sizes 0-2	Size 3	Sizes 4-5	
NO	R1	C320KB1	C320KB4	C320KB7	\$24.
② NO-NCI	R1	KB2	KB5	KB8	32.

AUXILIARY CONTACTS — SIZES 6-8

Circuit	Size 6	Size 7	Size 8	Catalog Number	Kit Price
NO-NC	---	L2, R1, R2	L2, R2	C320KA5	\$88.
2NO-2NC	R1	---	---	C320KA6	88.

NOTE: Individually boxed auxiliary contacts master packed 10 per carton. Does not apply to base auxiliary contacts.

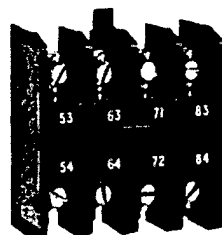
① NO-NC occupies two positions — L2 & L3 or R2 & R3.

② NCI is a normally closed early opening contact designed for use in reversing applications.

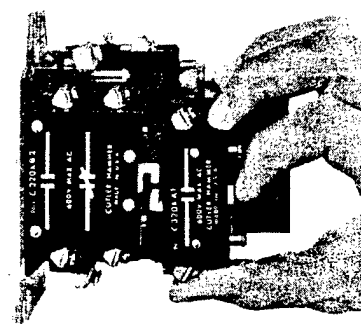
③ Contacts listed for Size 2 & 3 are for the new Series B1 starters. If they are to be installed on previous design Size 2 & 3 Series A1 starters, select one size larger — for Size 2 use contacts listed for Size 3, for Size 3 use contacts listed for Size 4.

MAXIMUM AMPERE RATING

Description	Volts Ac			
	120	240	480	600
Make & Interrupting Capacity ...	60.0	30.0	15.0	12.0
Normal Load Break	6.0	3.0	1.5	1.2
Continuous Current	10.0	10.0	10.0	10.0



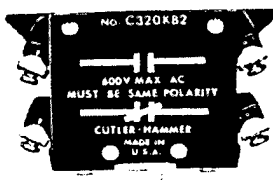
Auxiliary Contacts — Size 00



Addition of auxiliary contacts is a simple stack-on and screw-down operation



Auxiliary Contact — Size 0-5, Size 6 & 7 Series A1



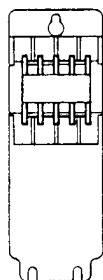
Base Auxiliary Contact — Size 0-5, Size 6 & 7 Series A1



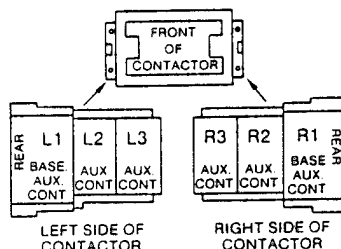
Auxiliary Contacts Sizes 6-8 Series B1

LOCATIONS OF AUXILIARY CONTACTS ON NON-REVERSING CONTACTORS

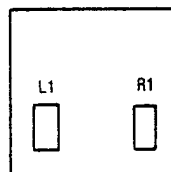
The sketches below illustrate the maximum number of auxiliary contacts that can be assembled to a contactor and their locations.



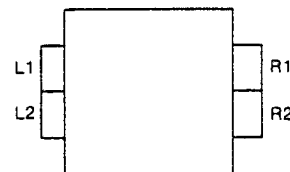
Size 00



Size 0-5



Size 6



Series 7-8

A Base Auxiliary Contact must be added in position R1 before additional auxiliary contacts can be mounted on the right hand side on Sizes 0-5.

DISCOUNT SCHEDULE 1CD-1

Printed in U.S.A.
GG

EATON

1/3/86

Non Plug-in Limit Switches — Types L, LX, CX, CB & CBX

Oiltight, Watertight & Hazardous Locations

FILE

E50 10316

WHEN ORDERING SPECIFY

Rotary Operated Switches

- Catalog Number of Basic Switch
EXAMPLE — 10316H187

- Catalog Number of Operating Lever
EXAMPLE — E50KL200 (levers listed on page 218-219).

Push and Wobble Operated Switches

- Catalog Number of Complete Switch
EXAMPLE — 10316H282

BASIC CLASSIFICATIONS

Type L — Single pole, die cast zinc alloy case, meets NEMA 1, 4 and 13 requirements — Watertight, Dusttight & Oiltight.

Type LX — Single and double pole, cast aluminum case meets NEMA 7 Class I Groups BCD and NEMA 9 Class II Groups EFG requirements — Hazardous Locations Gas/Dust.

Type CX — Single and double pole, die cast aluminum body and die cast zinc alloy head, meets NEMA 1, 4, 7 Class I Groups BCD and NEMA 9 Class II Groups EFG and 13 requirements — Watertight, Dusttight, Oiltight and Hazardous Locations Gas/Dust.

Type CB — Single and double pole, silicon bronze body and head, meets NEMA 1, 4, 4X and 13 requirements — Watertight, Dusttight, Oiltight and Corrosion Resistant.

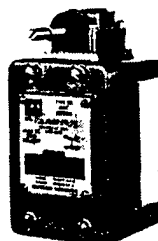
Type CBX — Single and double pole, silicon bronze body and head meets NEMA 1, 4, 4X, 7 Class I Groups BCD and NEMA 9 Class II Groups EFG and 13 requirements — Watertight, Dusttight, Oiltight, Corrosion Resistant and Hazardous Locations Gas/Dust.



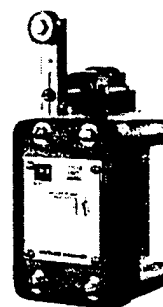
Type L



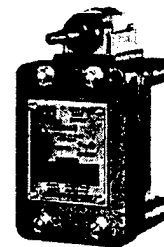
Type LX



Type CX



Type CB



Type CBX

OPERATING DATA — NOMINAL

Operating Head	Degrees Travel Operate Contacts	Operating Torque	Degrees Total Travel	Min. Return Torque	Degrees Travel to Reset Contacts
SIDE ROTARY LEVER					
Std. Construction	10	3 in.-lb.	50	4.5 in.-oz.	4
Low Operating Force	20	1.3 in.-lb.	50	2.5 in.-oz.	8
Narrow Differential	5	6 in.-lb.	50	4.5 in.-oz.	2
Neutral Position Maintained	18	1.8 in.-lb.	50	2.5 in.-oz.	6
	50	1.5 in.-lb.	90	---	40

TOP ROTARY LEVER					
Std. Construction	20	1.1 in.-lb.	140	3.0 in.-oz.	12
Low Operating Force	20	0.75 in.-lb.	140	2.0 in.-oz.	12

Type of Operating Head	Travel To Operate Contacts	Force To Trip	Total Travel	Min. Return Force	Travel To Reset Contacts
------------------------	----------------------------	---------------	--------------	-------------------	--------------------------

PUSH OPERATED					
Top Push	.04 Inches	4 Lbs.	.28 Inches	8 oz.	.02 inches
Side Push					
Spring Return	.07 Inches	4 Lbs.	.29 Inches	8 oz.	.03 Inches
Side Push Maintained	.20 Inches	5 Lbs.	.32 Inches	8 oz.	.13 Inches

WOBBLE OPERATED					
Wobble Spring	20 Degrees	1 in.-lb.	15 Degrees	2.4 in.-oz.	6 Degrees
Wobble Stick	20 Degrees	2 in.-lb.	15 Degrees	5-6 in.-oz.	6 Degrees
Cat Whisker	15 Degrees	0.63 in.-lb.	30 Degrees	2.4 in.-oz.	5 Degrees

ELECTRICAL DATA — Maximum Contact Ratings — Per Pole

A-c Volts	Current, Amperes			Voltamperes		D-c Volts	D-c Current, Amperes
	Make	Break	Cont. ③	Make	Break		
ALL SWITCHES 1 NO-1NC							
NEMA A600 Rating						120 240	0.2 0.1
120	60	6	10	7200	720		
240	30	3					
480	15	1.5					
600	12	1.2					
ALL OTHER SWITCHES							
120	30	3	10	3600	360	120 240	0.1 0.05
240	15	1.5					
480	7.5	0.75					
600	6	0.60					

OPERATING TEMPERATURE①

Limit Switch	Temperature Range	
	Low	High
Standard Time Delay	-20°F (-29°C) 32°F (0°C)	200°F (93°C) 150°F (65°C)

① Temperature ranges below +32°F are based on absence of freezing moisture or water.

③ Thermal rating. Valid only if switch does not have to make or break.

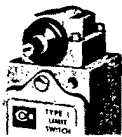
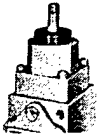



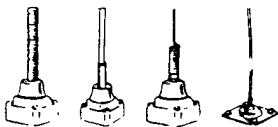
② Travel with force applied at one inch radius. Applied at end of operator, travel is approximately 14° for spring 20° for nylon, 60° for wire and 30° for cat whisker.

FILE

E50 10316

Non Plug-In Limit Switches Type L — Oiltight and Watertight

COMPLETE NON PLUG-IN SWITCHES SINGLE POLE 1 NO-1 NC (For Ordering Information, See previous pg.)

Operating Characteristics	OPERATING DATA — NOMINAL					Cat. No.	Price In Lots Under 100 (See Note)	
	Travel To Operate Contacts	Travel To Reset Contacts	Total Travel	Force To Operate Contacts	Minimum Return Force			
	SIDE ROTARY OPERATED							
Standard Low Force	10° 20°	4° 8°	50° 50°	3 in.-lb. 1.5 in.-lb	4.5 in.-oz 2.5 in.-oz	10316 H187 H812	\$58. 58.	
	TOP ROTARY OPERATED							
Clockwise Counterclockwise	20° 20°	12° 12°	140° 140°	1.1 in.-lb 1.1 in.-lb	3 in.-oz 3 in.-oz	10316 H700 H701	62. 62.	
	SIDE PUSH OPERATED							
Pushbutton	0.07 in	0.03 in	0.29 in	4 lb	8 oz	10316 H282	68.	
Adjustable Pushbutton	0.07 in	0.03 in	0.29 in	4 lb	8 oz	H621	72.	
Vertical Roller — 7/16 Dia.	0.07 in	0.03 in	0.29 in	4 lb	8 oz	H284	76.	
— 3/4 Dia.	0.07 in	0.03 in	0.29 in	4 lb	8 oz	H872	84.	
Horizontal Roller — 7/16 Dia.	0.07 in	0.03 in	0.29 in	4 lb	8 oz	H285	76.	
— 3/4 Dia.	0.07 in	0.03 in	0.29 in	4 lb	8 oz	H873	84.	
	Maintained Pushbutton	0.20 in	0.13 in	0.32 in	5 lb	5 lb	H294	80.
	TOP PUSH OPERATED							
Pushbutton	0.04 in	0.02 in	0.28 in	4 lb	8 oz	10316 H281	64.	
Adjustable Pushbutton	0.04 in	0.02 in	0.28 in	4 lb	8 oz	H620	68.	
Roller — 7/16 Dia.	0.04 in	0.02 in	0.28 in	4 lb	8 oz	H283	68.	
— 3/4 Dia.	0.04 in	0.02 in	0.28 in	4 lb	8 oz	H577	76.	
	WOBBLE OPERATED							
Spring	10°	6°	15°	1 in.-lb	2.4 in.-oz	10316 H299	64.	
Nylon Rod	10°	6°	15°	2 in.-lb	2.4 in.-oz	H296	64.	
Wire	10°	6°	15°	2 in.-lb	2.4 in.-oz	H484	64.	
Cat Whisker	15°	5°	30°	0.63 in.-lb	1.7 in.-oz	H341	48.	

① Contacts must be same polarity when both circuits are used.

CURRENT TRANSDUCERS

Model	Description	Input:Output	List	Code
4CTV	CURRENT TO VOLTAGE	0-20amp:0-5VDC	158.33	A
4CMA	CURRENT TO CURRENT	0-20amp:4-20ma	213.89	A

POTENTIAL TRANSFORMERS

Model	Voltage	Fused	List	Code
PT3-45-XXX □	Up to 4800:120	SINGLE	944.45	A
PT3-45-XXX □	Up to 4800:120	DUAL	944.45	A
3PT3-60-XXX □	Up to 4800:120	TRIPLE	1333.34	A
467-XXX □	Up to 600:120	NO	136.11	A
468-XXX □	Up to 600:120	NO	141.67	A

□ See catalog for complete model number / non-stock item

VOLTAGE / PHASE LOSS TRANSDUCERS

Model	Description	Input:Output	List	Code
LVM-348-120	L TO N VOLTAGE MONITOR	90-150 3Ø VOLTS:4-20ma	486.12	A
LVM-348-240	L TO N VOLTAGE MONITOR	180-300 3Ø VOLTS:4-20ma	486.12	A
PVM-348	L TO L VOLTAGE MONITOR	185-530 3Ø VOLTS:4-20ma	486.12	A
LPVR-XXX	PHASE LOSS MONITOR	3Ø VOLTS:SPDT	486.12	A
258B	208V PHASE FAILURE	3Ø VOLTS:SPDT	208.34	A
A258B	480V PHASE FAILURE	3Ø VOLTS:SPDT	208.34	A
AMPHENOL-8	SOCKET FOR A258B/258B		15.97	A
PFB-239	PHASE LOSS MODULE FOR USE WITH WHU-238	3Ø VOLTS:SPST	177.78	A

XXX - Specify Voltage (See catalog for complete number.)

NEW WT SERIES WATT TRANSDUCERS

Model	Voltage	Current	Output	List	Code
WT-5	120-600V	3CT/5amp	PULSE/4-20ma	883.34	A
WT-1	120-600V	3CT/1amp	PULSE/4-20ma	883.34	A
WT-5C*	120-600V	3CT/5amp	PULSE	744.45	A
WT-1C*	120-600V	3CT/1amp	PULSE	744.45	A

OPTIONS

Model	Description	List	Code
K1 OPTION ⁽¹⁾	CONSUMPTION METERING	125.00	A
K2 OPTION** ⁽¹⁾	CONSUMPTION/DEMAND METERING	402.78	A
SW OPTION ⁽¹⁾	SHORTING SWITCH & COVER (MOUNTED & WIRED)	202.78	A

(1) Options apply only to WT-5 & WT-1 (Not applicable to WT-5C or WT-1C.)

* Non-stock items - normal delivery is 4 weeks.

** Separate 24VDC power supply may be required.

SET POINT LED READOUT

CALIBRATION / INDICATION					
Model	Description	Accuracy	Range	List	Code
CLC-100	4-20ma/VOLTAGE CALIBRATION MTR.	±1%		1080.56	B
CLC-100-PW1	ABOVE w/PWM CALIBRATING OPTION	±1%		1483.35	B
HM34	PORTABLE HUMIDITY/TEMPERATURE	±2% / ±1%	0-100%, 4° to 140°F	1097.23	B
TM99A	DIGITAL THERMOMETER	±.2°F	-40° to 300°F	280.56	B
SH66A	3 PROBE DIGITAL THERMOMETER	±.2°F	-40° to 300°F	408.34	B
LPI-1	LOOP POWERED LCD INDICATOR	±0.1%	SPECIFY	272.22	B
LPI-1E	LCD w/NEMA 4X ENCLOSURE	±0.1%	SPECIFY	347.23	B
LPI-2	LED INDICATOR	±0.1%	SPECIFY	272.22	B
LPI-2E	LED w/NEMA 4X ENCLOSURE	±0.1%	SPECIFY	347.23	B
ALD-1	LCD COUNTER DISPLAY			108.33	B

PLUS ENCLOSURE, POTEN

- 40

\$176.11

CHART RECORDERS • DICKSON			
Model	Description	List	Code
SC4	4" TEMPERATURE RECORDER	552.78	B
SC8	8" TEMPERATURE RECORDER	941.62	B
TH4	4" TEMPERATURE / HUMIDITY RECORDER	1250.01	B
TH8	8" TEMPERATURE / HUMIDITY RECORDER	1513.90	B
PR4	4" PRESSURE RECORDER	888.90	B
PR8	8" PRESSURE RECORDER	1277.79	B
001-20-09-4-00	MINI-GRAPH 4-20ma RECORDER	972.23	B
CIRCULAR CHARTS	4" CHART, BOX OF 100	38.89	B
	8" CHART, BOX OF 100	44.44	B
STRIP CHARTS	62" LONG, 2 1/2" WIDE - WITH BOX OF 6	150.00	B

CHART RECORDERS ARE NON-STOCK ITEMS - NORMAL DELIVERY IS 1-3 WEEKS.

Measurement ▼ Analysis ▼ Control

WATER MEASUREMENT & ANALYSIS

Nature originally provided life's "vital fluid" with certain key ingredients that were correctly balanced to support and maintain all life forms:

- ◆ It was neither very acid nor very alkaline—pH
- ◆ It ranged from fresh to very salty—Conductivity (TDS)
- ◆ It contained the right amount of—Dissolved Oxygen (DO)
- ◆ It could be clean & clear—Turbidity

Population, urbanization, industrialization, and pollution from all sources have altered this balance and brought us to a world-wide crisis. To resolve this crisis, we must now monitor, measure, analyze, and control water throughout its life cycle.

The following pages present the basic measurements in a simple WHAT - WHY - HOW format to provide a better understanding of these parameters to the many non-scientific people involved in today's day-to-day water analysis.

pH

WHAT?

pH is a number that exactly describes the degree of acidity or basicity (alkalinity) of an aqueous (water) solution. A good analogy can be made to the measurement of temperature. The terms "hot" and "cold" are very general terms which cannot be used with any degree of accuracy. What may be warm to one person may be hot to another. To avoid such ambiguities, the temperature scale was developed based upon the freezing (0 °C) and boiling (100 °C) points of water. Now, a temperature reading of 50 °C means the same to everyone and is scientifically accurate.

In the same way, the pH scale was developed. Centuries ago people discovered that certain materials possessed properties which were called acid, while others possessed other properties which were called basic. Between these two extremes was an area in which the materials showed neither acid or base properties, an area which was termed neutral.

Just as with hot and cold, the words acid and base (alkali) do not give us a value for scientific comparison. We need a scale on which we can all agree when discussing the degree of acidity or basicity. Years ago, Sorensen developed such a scale and came up with the symbol "pH" (p = negative logarithm, H = hydrogen ion).

- ◆ An acid must have ionized (or free) hydrogen ions, H^+ .
- ◆ A base must have ionized (or free) hydroxyl ions, OH^- .
- ◆ The pH is directly related to the ratio of the H^+ to OH^- . If the H^+ is greater than the OH^- , the material is acid. If the OH^- is greater than the H^+ , the material is a base. If equal amounts are present, the material is a neutral salt.

Since pH is a logarithmic function, each pH unit change represents a change of 10 TIMES. A solution with a pH value of 2.00 is 100 times more acid than a solution with a pH value of 4. Likewise, pH 10 is 1000 times more basic (alkaline) than pH 7.

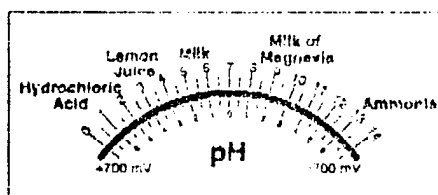


Figure 1

Do all acids and bases act the same? Unfortunately, they do not. The major

difference arises from the amount of free H^+ and OH^- present in solution. For example, when hydrochloric acid is dissolved in water, all the hydrogen ions (H^+) are free in the solution. The same is true of sodium hydroxide and hydroxyl ions (OH^-). However, when acetic acid is dissolved in water, all of the hydrogen ions H^+ are not free (only about 1.3% of the total H^+ is free) and the pH is considerably higher (more basic) than would normally be expected. Thus, acetic acid (vinegar) is called a weak acid. A good example of a weak base is ammonium hydroxide (household ammonia). A strong base (lye) can be just as harmful or destructive as a strong acid (hydrochloric).

WHY?

If the pH in your body were lowered one pH unit, you would die. Living things grow and survive within specific pH environments. When the pH is not correct, sometimes within very narrow limits, their growth and survival are threatened. For example, wheat, corn, and other foodstuffs grow best in soil of a particular pH. To get the greatest yield, the farmer must condition his soil to achieve the proper pH. This explains, in part, why the yield-per-acre of American farmers has increased over the years. Soil science has shown the farmer how to provide optimum conditions for best yield.

Other areas of pH importance include:

- ◆ Purification of drinking water depends on the correct pH.
- ◆ In sugar manufacture, improper pH can result in formation of unwanted acids and very little sugar.
- ◆ In sewage treatment, pH must be adjusted for proper operation. This is another reason why polluting sewers with spills of high acid or alkaline materials is undesirable.
- ◆ Milk sours at a pH of 6.00 and lower (more acid). Good milk requires good pH control.

WATER MEASUREMENT & ANALYSIS

- ◆ In old-fashioned jelly making, the pH must be below 4.0 (more acid). Otherwise, the jelly will not jell.
- ◆ The brightness of chrome plating on auto bumpers is directly related to the pH of the plating solution.

HOW?

pH can be measured very accurately using a special pH electrode, electronics that amplify the electrode current to a usable level, and a meter to display the results.

pH Electrode

The pH electrode (probe) can be thought of as a small battery whose voltage changes as the pH of the solution in which it is inserted changes. It consists of two parts: a thin glass bulb sensitive to hydrogen ion, and a reference cell. The special nature of the glass bulb allows H^+ to pass through. This ability sets up a potential (voltage difference) due to the concentration difference between H^+ inside and outside the bulb. This bulb is then a measuring "half-cell". The other half is the reference portion of the electrode. It typically consists of a silver wire coated with silver chloride which is immersed in a saturated KCl gel. The reference cell produces a known voltage against which the measuring voltage is compared. Electrical contact to the sample solution (completing the electrical circuit) is made through an annular junction (typically porous ceramic) located just above the pH sensitive bulb. Together, the pH sensitive bulb and the reference cell constitute the complete probe.

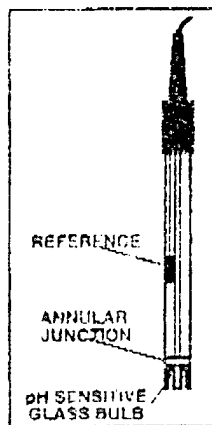


Figure 2

The voltage produced by the probe is a linear function of the pH. For example, at

pH 7.00 (neutral) the probe produces zero volts while at pH 6.00 it produces +60 millivolts. Minus (-) 60 millivolts would be a pH of 8.00. Generally, a pH probe will produce about 60 millivolts for each change of one (1) pH unit. Thus, a probe voltage of +300 millivolts would indicate a pH value of 2.00 (300 divided by 60 = 5 units, 7 units minus 5 units = 2 units.)

Electronics & Display

Generally, the electronics and display (analog or digital) are combined in a single instrument case, collectively referred to as "the meter". Although the basic function of all meters is the same — providing the signal amplification, conditioning, and calibration for accurate and reliable display of the correct pH value—there can be considerable variation in packaging (field or laboratory use) and in overall accuracy and repeatability. Additional electronics and outputs can also be added to set levels at which pumps and alarms can be activated to alert or correct for "out-of-range" pH levels (controllers).

Like most of life, things are not always as simple as we would like. The temperature of the solution being measured has an effect on the accuracy of the pH reading; temperature affects the equilibrium constant of the solution and hence the amount of H^+ and OH^- . If your probe or meter does not have automatic temperature compensation (ATC), the manual temperature adjust must be set.

Buffers

Since the pH meter and probe are both electronic-type devices, you should have standard pH solution available which you can use to make sure that everything is calibrated and operating correctly. These solutions are called "standard buffers". A good buffer is a vital part of all pH measurements.

pH buffers are solutions of specific and very accurate pH values that resist change even when other materials are added. However, care should be taken to avoid contamination.

Always set the SET adjustment of the pH meter first, using a pH 7.00 buffer, regardless of the range you are measuring. This guarantees calibration of the meter to the true zero output of the probe. (Output varies among different probes, and with age.) The SLOPE adjustment is then made using a buffer with a value closest to your expected sample reading.

Conductivity - Resistivity

WHAT?

Conductivity is the term used to express the ability of a substance to conduct an electric current. Resistivity is the term used to express the lack of ability of a substance to conduct an electric current, i.e.,

$$\text{Conductivity} = 1/\text{Resistivity}$$

Both are directly related to the amount of total dissolved solids (TDS). These solids are basically salts. Although often confusing, the terms Conductivity, Salinity, TDS, Ion Concentration, Resistivity are all the same, or directly related measurements.

Terms of measurement are:

S = Siemens/cm = mho = 1/ohm

μ = micro = 10^{-6}

m = milli = 10^{-3}

Meg = 10^6

g = gram L = Liter

ppm = parts per million

ppt = parts per thousand

Ω = ohm = 1/mho

TO ORDER, CALL: 1-800-262-3668

Measurement ▼ Analysis ▼ Control

WATER MEASUREMENT & ANALYSIS

Measurements are expressed as follows:

Conductivity	= μS or μmho mS or mmho
Salinity	= ppm or ppt TDS
Ion Concentration	= mg/L or g/L
Resistivity	= Megohms

$$100 \mu\text{S} = 100 \mu\text{mhos} = 10,000 \text{ ohms}$$

$$\approx 50 \text{ ppm} \approx 50 \text{ mg/L}$$

Some typical values:

Pure water
 $0.055 \mu\text{S}$ or $\mu\text{mhos} = 18 \text{ Megohms}$

Distilled water:
 $0.5 \mu\text{S}$ or $\mu\text{mhos} = 0.25 \text{ ppm}$

Boiler water:
 $1 \mu\text{S}$ or $\mu\text{mhos} = 0.5 \text{ ppm}$

Good city water:
 $50 \mu\text{S}$ or $\mu\text{mhos} = 25 \text{ ppm}$

Potable water (max.):
 1 mS or $\text{mmhos} = 500 \text{ ppm}$

Ocean water:
 50 mS or $\text{mmhos} = 50 \text{ ppt}$

Nitric acid:
 860 mS or $\text{mmhos} = 430 \text{ ppt}$

Healthy aquaculture depends upon water containing the "right" amount of salts.

In industry, a build-up of salts (conductivity) can ruin boilers and corrode pipes, fittings, and valves.

Measurement of conductivity offers a fast, reliable, inexpensive, and non-destructible means of establishing the ionic condition of a liquid. Not so incidentally, the conductivity of a substance significantly affects dissolved oxygen and pH measurements. Therefore, this information is essential to compensate other readings.

HOW?

As with pH, the basic components of measurements are a probe (detection), electronics (signal conditioning), and display (meter).

Unlike the pH probe, the typical conductivity probe has two electrodes with a voltage "potential" applied across them, i.e., coming from the electronics. The amount of current flow between the electrodes is governed by the conductivity (resistivity) of the sample solution between them. This signal is amplified and conditioned by the electronics to provide the display with the correct data in the proper form, i.e., μS , ppm, mg/L.

One drawback of conductivity is that it is a non-specific measurement; it cannot distinguish between different types of ions, giving instead a reading that is proportional to the combined effect of all ions present. Some ions contribute far more than others and multi-component mixtures may present problems. Common organic compounds such as alcohols, sugars, petroleum products, and soil products do not give usable conductivity measurements. Some materials may also reduce the measurement accuracy by coating the probe. Conductivity measurements have a relatively high temperature dependence to the measurement, requiring

temperature compensation. In many cases, these considerations are not serious, or can be compensated so that quite accurate readings are obtained. Although rugged and very stable, conductivity probes should be checked periodically with a standard solution of known value.

Dissolved Oxygen

WHAT?

Oxygen itself needs little explanation! We know it is vital to life and supports all combustion. Dissolved oxygen, as the name implies, is the amount of oxygen naturally absorbed out of the air or forced (bubbled) into a liquid. It is typically measured in ppm (part per million) or % Sat (% of Saturation), where normal moist air is considered 100% oxygen saturated.

WHY?

Dissolved oxygen measurements are vital in many industries and important in laboratory research. Its pretty obvious that healthy marine life depends on an optimum supply of dissolved oxygen. Overall "life" conditions of lakes, rivers, and bays can be determined and monitored by DO measurements (before fish float to the surface). Therefore, proper monitoring is essential to an understanding of environmental parameters and to the growing aquaculture industry. In sewage treatment, the amount of residual organic matter can be determined by the change in oxygen level. The food industry monitors the amount of oxygen in canned goods and bottled products to avoid bacterial growth and spoilage.

HOW?

The practical measurement of dissolved oxygen requires considerably more care and attention than that of pH or conductivity. However, the basic components are the same: a probe for detec-

WHY?

A proper balance of conductivity is essential to humans, animals, plant life, and industry. Listed below are only a few of many examples:

In humans, it's taste up to a certain point! Ask anyone who has been lost at sea if they could survive on ocean water.

All marine life is dependent on a conductivity environment consistent with their species.



Industrial Chemical Measurement

WATER MEASUREMENT & ANALYSIS

tion, electronics for signal amplification and conditioning, and meter to display the results.

Most oxygen probes are of the polarographic type, consisting of:

- ◆ Anode & Cathode (battery)
- ◆ Filling Solution (electrolyte)
- ◆ Membrane (permeable to O_2 molecules)
- ◆ Thermistor (temperature compensation)

In simplest terms, the oxygen molecules diffuse through the permeable membrane and cause a change in current flow between the anode and cathode. The current flow is proportional to the amount of oxygen present. Because of its major affect on accuracy, temperature is sensed as close as possible to the membrane surface. The electronics in the meter amplify, condition, and present the appropriate data to display the results as ppm or % Sat.

Turbidity

WHAT?

Turbidity is a physical property of water that refers to its degree of cloudiness or haziness. It is caused by the presence of small suspended particles of such materials as clay, silt, algae, organic and inorganic matter, and other microorganisms. When light interacts with these particles, light "scattering" occurs that produces a cloudy appearance to the human eye. (Milk is a good example of a very turbid material—it is opaque and appears "white" to the eye.)

WHY?

In addition to the obvious aesthetic effects, high levels of these small particles in drinking water can support the growth of harmful microorganisms and reduce the effectiveness of chlorination, creating

a health hazard. Because of the hazards and for aesthetic reasons, high levels of suspended matter, as indicated by "turbidity", are generally regarded as unacceptable. A measure of turbidity, then, can be used to judge the general water quality, with limits and measurements imposed by the EPA.

HOW?

Light traveling through pure water or water containing completely dissolved substances passes straight through, producing no scattering. As light passes through water containing undissolved particles, it is "scattered" in many different directions, as shown in Figure 3, and not as much light passes straight through. The human eye perceives this diminished light as cloudiness.

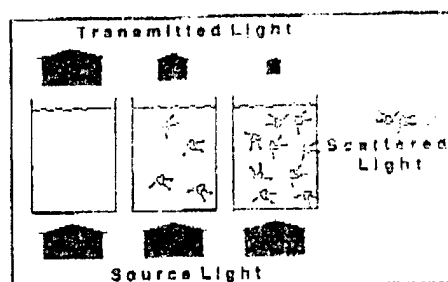


Figure 3

Instruments called turbidimeters (or nephelometers) are used to electronically measure the degree of scattering, displaying the results directly in arbitrary units called NTU's (Nephelometric Turbidity Units), typically over the 0-199 NTU range. To accomplish such measurements, see Figure 4, a highly regulated light source (tungsten lamp) is used to provide a steady source of visible light which is focused by a lens. As this light passes through a water sample, held in a special sample container called a "cuvette", some of the light is scattered in various directions by particles. The amount of light scattering is highly dependent upon the size and number of particles.

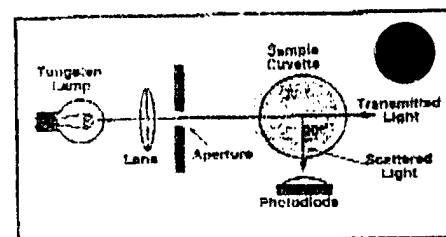


Figure 4

A light detector, i.e., a photodiode placed at right angles to the incident light beam senses the amount of scattered light and converts this light into an electrical signal. This signal is then displayed on a meter or digital display, generally calibrated to read out directly in NTU' (Nephelometric Turbidity Units).

Because the units of turbidity are quite arbitrary, it is absolutely essential that turbidimeters be calibrated against standards with known scattering properties. Basically, these are solutions of very special substances that scatter light in a predictable and repeatable fashion.

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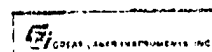
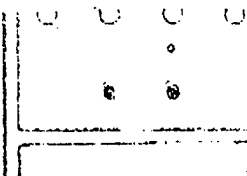
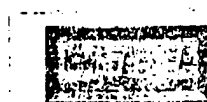
Model 91T/8201 Turbidimeter System

TURBIDITY

Data Sheet 91T/990
Supersedes 91T/1085

FEATURES

- EPA approved nephelometric measurement method
- Continuous and grab sample measurement capability
- Easy access plug-in circuit cards and terminal strips
- Modular construction simplifies field servicing
- Press-to-display setpoint values
- Switch selectable relay action - operates on increasing or decreasing reading
- Output range expansion



Model 91T Transmitter

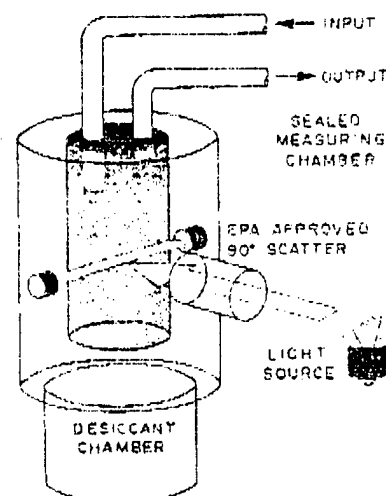
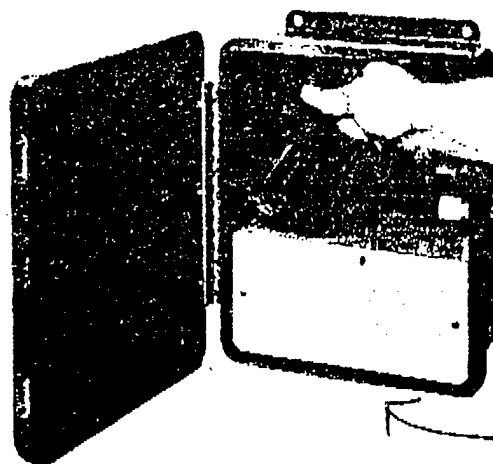
Description:

The Model 91T/8201 turbidimeter system is comprised of an industrial-grade quality transmitter and sensor that combine high measurement accuracy and low maintenance. The system is sensitive to minute changes in suspended solids concentration and measures to low levels. The system provides continuous measurement and may be used to analyze a grab sample. The Model 91T/8201 turbidimeter system features a bypass sensor with continuous sample flow for measurements up to 100 NTU's. The sample cuvette can be removed while "on line" for easy calibration. Typical applications include monitoring and control of potable

water, filter break-through and product clarity.

The Model 91T transmitter is housed in a water-tight, corrosion-resistant styrene enclosure for substantial environmental protection. Two stainless steel mounting brackets are included for panel, surface or pipe mounting. Plug-in circuit cards facilitate servicing. Transmitter options include meter, recorder or digital display, analog outputs and relay configurations. The Model 91T with meter or recorder display provides six selectable measuring ranges from 0-0.3 to 0-100 NTU's. The transmitter with digital display has selectable ranges of 0-1, 0-10 and 0-100 NTU's.

Model 8201 Sensor



Model 8201 Sensor Optic Details

TOTAL SYSTEM
COST \$1455



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The Model 8201 sensor is housed in a surface-mount NEMA 4X fiberglass enclosure. The sensor has a renewable desiccant cartridge to eliminate sample chamber condensation and maintain optical measurement integrity. Measurement methods are U.S. EPA approved (Storet 00076). High quality, stable photo cells are used. The outputs of the photo cells vary directly with the amount of scattered light dispersed by turbidity in the sample.

Measuring scales are in Nephelometric Turbidity Units (NTU) which correspond interchangeably with Formazin Turbidity Units (FTU). Calibration is referenced to standard formazin solutions.

MODEL 91T TRANSMITTER SPECIFICATIONS

Operational:

Measuring Ranges:

Meter 0 to 0.3/1/3/10/30 and 100 NTU's
Digital 0 to 1/10 and 100 NTU's

Stability 0.5% of full scale per day, non-cumulative at 25°C

Linearity Meter: $\pm 1\%$ of full scale
Digital: $\pm 0.25\%$ of full scale

Display: Meter (standard) 4 1/2" mirrored scale
Recorder (optional) 2 1/4" strip chart, single pen (inkless)
Digital (optional) 3 1/2 digit LED, 0.5" high digits

Response Time 0.25, 2.5 or 25 seconds, selectable

Ambient Conditions -30 to 50°C (-22 to 122°F), 0 to 100% R.H.

Relay Function (optional):

Control and Alarm Setpoints Continuously adjustable 0-100% of full scale
with press-to-display setpoint feature
Control Deadband Continuously adjustable 0-50% of full scale
Indicators LED lights when relay energizes
Contact Rating (U.L.) SPDT, 5A 115/230 VAC, 3A @ 30 VDC resistive

Note — Control or alarm relays operate on increasing or decreasing reading, switch selectable.

Sensor-to-Analyzer Distance 25 feet maximum without light source power module
300 feet maximum with light source power module

Electrical:

Power 98-132 VAC, 50 or 60 Hz (less than 40 VA)
optional 205-275 VAC, 50 or 60 Hz,
connections via terminal strip

Analog Outputs (standard) One voltage and one current signal (isolated):
0-1 mA, 100 ohms maximum load
0-5 VDC, 1000 ohms minimum load
One additional current signal (isolated):
4-20 mA, 625 ohms maximum load
0-20 mA, 625 ohms maximum load
10-50 mA, 250 ohms maximum load

Range Expand — The analog outputs can be made to represent a selected segment of the display range. This segment or "sub-interval span" cannot be smaller than 10% of the display range span, but may be positioned anywhere within that span.

Enclosure NEMA 4X, styrene structural foam (with flame
retardant additive), panel/surface/pipe mount

Net Weight 12 lbs. (5.5 kg) maximum

MODEL 8201 SENSOR SPECIFICATIONS

Wetted Materials PVC (Teflon optional), glass, Viton, and polyethylene (stainless steel optional)
Maximum Flow Rate/Pressure 1 gpm/60 psig
Maximum Sample Temperature 50°C (122°F)
Installation Connections 1/2" NPT female, PVC or stainless steel
Sample Configuration Continuous flow vial, borosilicate glass, flat bottom, 2 1/4" (70 mm) long
Enclosure NEMA 4X surface mount, fiberglass with stainless steel hardware
Net Weight 7.5 lbs. (3.4 kg)
Accessory Kit (included) One spare vial, 2 1/4" long
One grab sample cuvette with cap
One light shield
One spare lamp (with leads)
One spare fuse
One sealed vial of zero solution
One accessory kit carrying case

ORDERING INFORMATION

MODEL NUMBER

91T: Transmitter for use with Model 8201 sensor only, in a NEMA 4X styrene structural foam enclosure which can be panel, surface or pipe mounted (brackets included).

DISPLAY

- 1 Meter, 4 1/2" is standard (six ranges) ←
- 2 Recorder, in place of meter (six ranges)
- 3 Digital (three ranges)

ANALOG OUTPUTS (range expand included)

0-1 mA and 0-5VDC plus:

- C 4-20 mA ←
- D 0-20 mA
- E 10-50 mA

NOTE -- Since process sample is electrically isolated from transmitter, the analog output is effectively isolated.

LINE VOLTAGE

- 1 115 volts, 60 Hz. ←
- 2 240 volts, 50 Hz.
- 3 115 volts, 50 Hz.
- 4 240 volts, 60 Hz.

RELAYS

- A None ←
- B Two control relays (with adjustable deadband)
- C Two alarm relays (with fixed deadband)
- D Four relays: two control and two alarm relays

CONTROLLERS

- 0 None ←
- N Standard instrument ←
- K Special instrument

91T

0

Product Number

Choose one from each category

MODEL NUMBER

8201T: Bypass sensor for use to 100 NTU's in a NEMA 4X surface mount, fiberglass enclosure with integral 12 ft. cable and accessory kit.

Reserved categories

LIGHT SOURCE POWER

0 NOTE -- When sensor-to-transmitter distance exceeds 25 feet, an accessory remote power module must be specified. This module, in surface mount fiberglass enclosure, requires independent power and permits up to 300 feet of separation.

WETTED MATERIALS

- A PVC, glass ←
- B Teflon, glass (must also specify Installation Connections option as 2)

INSTALLATION CONNECTIONS

- 1 PVC, 1/4" NPT female ←
- 2 Stainless steel, 1/4" NPT female

- N Standard sensor ←
- K Special sensor

8201T

1

A

0

Product Number

Choose one from each category.

MODEL 8201 SPARE PARTS

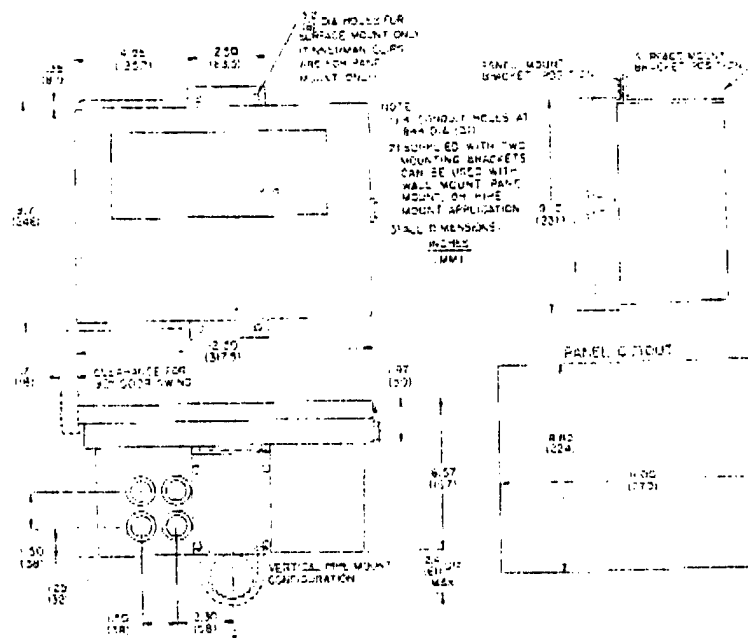
One Desiccant Cartridge 8201A2A2023
 One Flow-thru Vial 99X3A1049
 One Grab Sample Cuvette, with cap 8202A6A1001
 One Light Shield 8201A6F1001
 One Lamp (with leads) 8201A6A1000
 One Sealed Vial of Zero Solution 99X1A1001
 One Fuse, 1/4 A 99X1F0405

ACCESSORY REMOTE POWER MODULE

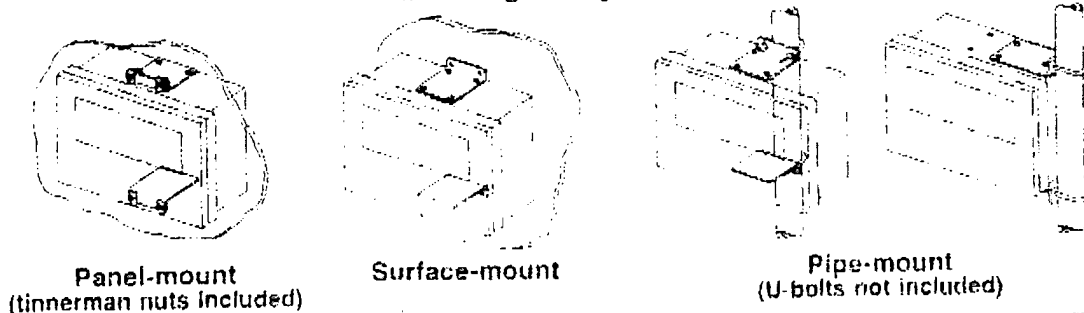
82SOA1AON 115 volts, 50/60 Hz.
 82SOA2AON 230 volts, 50/60 Hz.

DIMENSIONS AND MOUNTING

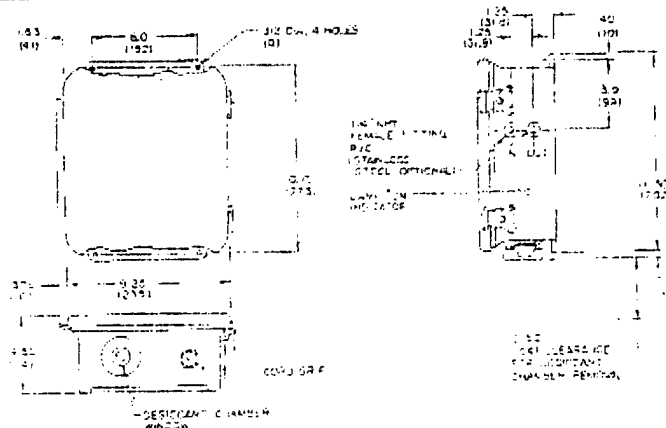
**Model 91T
Transmitter
Outline**



Mounting Configurations



**Model 8201
Sensor Outline**



Represented By:

Great Lakes Instruments, Inc.
8055 N. 55th Street
Milwaukee, WI 53223

Telephone (414) 355-3601
Telefax (414) 355-8346
Telex 26-9685



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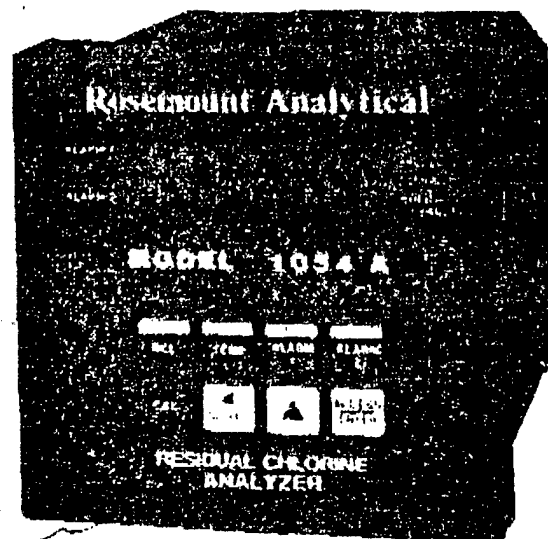
P.2

Rosemount Analytical

Model 1054A RCI Free Residual Chlorine Microprocessor Analyzer

COST \$969.00

- FM AND CSA APPROVED For Class I, Division 2, Gas Groups A, B, C, and D.
- SELF DIAGNOSTICS with a user selectable fault alarm.
- NEMA 4X (IP65) WEATHERPROOF CORROSION-RESISTANT ENCLOSURE.
- NO BATTERY BACK-UP REQUIRED. Non-volatile EEPROM memory.
- DUAL ALARMS WITH PROGRAMMABLE LOGIC. A third relay is provided with timer functions.
- HOLD OUTPUT FUNCTION is programmable to default to a preset or process value.
- KEYBOARD SECURITY is user selectable.



*REQUIRES A
SEPERATE SENSOR*

FEATURES AND APPLICATIONS

The Model 1054A Microprocessor Analyzers, with the appropriate sensor, are designed to continuously measure and control pH, ORP, conductivity, percent concentration, dissolved oxygen, or free residual chlorine, in industrial and municipal processes.

The Model 1054A is housed in a NEMA 4X (IP65) weatherproof corrosion-resistant, flame retardant enclosure suitable for panel, pipe or wall mounting. All functions are accessed through the front panel membrane keyboard which features tactile feedback. Measurement data may be read at any time, however, settings may be protected against accidental or unauthorized changes by a user selectable security code. The display indicates the measured value in engineering units as well as temperature, alarm status, hold output and fault conditions.

The 1054A transmits a user selected isolated current output is continuously expandable over the measurement range in either Direct or Reverse and can be displayed in millamps or percent. Output dampening of 0-999 secs. is user selectable.

The hold output and relay defaults are user selectable. The hold output function allows manual control during routine sensor maintenance.

Dual alarms are a standard feature on the Model 1054A and are programmable for either high or low operation. Alarm 2 may be programmed as a fault alarm. Both alarms feature independent setpoints, adjustable hysteresis and time delay action. A dedicated interval timer with relay is also provided.

Automatic or manual temperature compensation is keyboard selectable. The process temperature is accurately measured at the sensor assembly and is read on the display. For greater accuracy, the temperature indication may be standardized to the process temperature. The temperature may be configured to read in °C or °F.

Calibration is easily accomplished by on-line standardization to a grab sample solution.

The Model 1054A Microprocessor Analyzer comes standard with an LCD display. An LED display is available as an option.

The Model 1054A's continuous self diagnostics alert the operator to PCM, EEPROM, temperature, measuring electrode and open wiring faults.

PHYSICAL SPECIFICATIONS - GENERAL

Panel Mount Enclosure: Black, ABS, NEMA 4X, IP65.

CSA Enclosure 4.

144 X 144 X 192mm

(5.7 X 5.7 X 7.5 inches)

Wall Mount Enclosure: NEMA 4X, Thermoplastic

300 X 330 X 190mm

(11.75 X 13 X 7.5 inches).

Front Panel: Membrane keyboard with tactile feedback and user selectable security. Black and white on grey.

Digital Display: LCD, black on grey

Optional: red LED

Character Height: 18mm (0.7 inch)

Electrical Classification:

Group I Panel Mount Enclosure: FM and CSA,

Class I, Div. 2, Group A thru D,
28 VDC relays only.

Group II Wall Mount Enclosure: General Purpose

Power: 115 VAC, $\pm 10\%$, 50/60 Hz $\pm 6\%$, 4.0 W

230 VAC, $\pm 10\%$, 50/60 Hz $\pm 6\%$, 4.0 W

Current Output: Isolated, 0-20 mA or 4-20 mA

Into 600 ohms maximum load, Direct or Reverse

Output Dampening: 0-999 seconds

Ambient Temperature: -10 to 65°C (14 to 149°F)

Ambient Humidity: 0-95%

Alarms: Dual, field selectable High/Low, High/High, Low/Low

Alarm 2 configurable as a fault alarm

Time Delay 0 to 254 seconds

Dual Setpoints, continuously adjustable

Hysteresis is adjustable up to 2 pH units or 25% full scale
for low side/High Alarm and high side/Low Alarm

Interval Timer: Interval: 10 min. to 2999 days

On Counts: 1 to 60

On Duration: 1 to 299.9 seconds

Off Duration: 1 to 299.9 seconds

Wait Duration: 1 to 299.9 seconds

Controls dedicated relay

Relay Contacts: Epoxy Sealed Form A contacts, SPST, Normally
Open.

Resistive Inductive

28 VDC 6.0 Amps 3.0 Amps

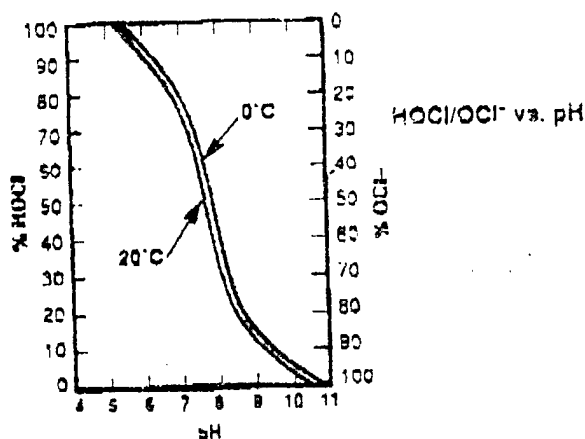
115 VAC 6.0 Amps 3.0 Amps

230 VAC 6.0 Amps 1.5 Amps

Weight/Shipping Weight: 1.1 kg/1.6 kg (2.5 lbs./3.5 lbs.)

The Model 1054A Free Residual Chlorine Analyzer measures free residual chlorine as hydrochlorous acid (HOCl) and hydrochlorite ion (OCl-) over the full range of 0-20.0 mg/L. Free residual chlorine commonly exists as a pH and temperature dependent mixture of HOCl and OCl- (see graph). The Model 1054A RCI provides both automatic temperature compensation and manual pH correction for accurate measurement. The patented free residual chlorine sensor is a polarographic sensor that eliminates the need for wet chemical analysis and the maintenance associated with these analyzers.

U.S. Patent No. 3,997,194
U.S. Patent No. 4,197,162
Canadian Patent No. 1,025,495



INSTRUMENT SPECIFICATIONS @ 25°C

Measurement Range: 0-20 mg/L (ppm)

Output Scale Expansion: Zero suppression: up to 90% full scale
Span: from 0% to 90% full scale

Accuracy: $\pm 0.5\%$ of measured range

Repeatability: $\pm 0.25\%$ of output range

Stability: $\pm 0.25\%$ of output range/month, non-cumulative

Temperature Coefficient: Input $\pm 0.03\%$ of reading/°C
Output $\pm 0.04\%$ of reading/°C

Temperature Compensation: 0 to 50°C (32 to 122°F)
(automatic or manual)

RECOMMENDED SENSOR:

Model 450 Sensor

COST
\$477.00

Technical drawing of the Lowmont Analytical Model 1000-B Analyte meter, showing front and side views with dimensions and labels.

FRONT VIEW COVER OPENED

Labels and Dimensions:

- 8 DIA. 31 4 MTG. HOLES
- CLEAR ACRYLIC WINDOW 5 X 5 X .125 THICK
- 343 13.5
- 438 12.75
- 298 11.75
- 203 8
- 184 7.63
- 175 6.88 (REF)
- 3/4" CONDUIT FITTINGS 2 PLACES
- HOLE PLUG
- VIEW A-A WITH COVER ON DASH LINES

The drawing includes a front view with the cover open, showing the internal components and a clear acrylic window. A side view (View A-A) is shown with dashed lines, indicating the cover is closed. The meter is labeled "Lowmont Analytical MODEL 1000-B ANALYTE".

ORDERING INFORMATION

171-1054A RCI Mar. 1991

The Model 1054A RCI Free Residual Chlorine Microprocessor Analyzer: Housed in a NEMA 4X corrosion resistant, weatherproof housing suitable for panel, pipe, or wall mounting. The analyzer operates on 115 VAC, 50/60 Hz power unless otherwise specified. Standard features include LCD digital display, isolated current outputs, dual programmable alarms and timer relay, default settings, and automatic and manual temperature compensation.

MODEL
1054A RCI MICROPROCESSOR ANALYZER (3.5 lbs./1.5 kg)

CODE GROUP I: PANEL MOUNT ENCLOSURE OPTIONS (Select from either Group I or Group II, not both)	
02	LED Display
05	230VAC, 50/60 Hz
07	Wall mounting bracket
08	2" pipe mounting bracket
11	Stainless steel tag (specify marking)

CODE GROUP II: WALL MOUNT ENCLOSURE OPTIONS (Select from either Group I or Group II, not both)	
20	LCD Display, 115VAC, 50/60 Hz
21	LCD Display, 230VAC, 50/60 Hz
51	Enclosure heater for Code 20
52	Enclosure heater for Code 21
11	Stainless steel tag (specify marking)

1054A RCI 05 - 07 - 11 EXAMPLE

NOTES:
SELECT OPTIONS FROM GROUP I OR GROUP II, NOT BOTH.

ROSEMOUNT

Measurement
Control
Analytical
Valves

Rosemount Analytical Inc.
2400 Barranca Parkway
Irvine, CA 92714
Tel: (714) 853-1191
Telex: 87-8387 UNILOC IRIN
Fax: (714) 474-7250

**BUILDING-BY-BUILDING
COST ESTIMATE BACKUP DATA**

COST ESTIMATE

BUILDING 181

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY										INVITATION NO./CONTRACT NO.				EFFECTIVE PRICING		DATE PREPARED													
LOCATION FT. LEONARD WOOD, MISSOURI										DACA41-92-C-0098				MARCH 1993		29-Mar-93													
BLDG. NO. 181										<input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER				DRAWING NO.		SHT OF													
BOILER & GENERATOR										LABOR				EQUIPMENT		MATERIAL		ESTIMATOR		TOTAL		CHECKED BY		CEL					
SYS. NO. MISC.										No. Of Units MH/ Unit Total Hrs				Unit Price Cost Unit Price Cost				Unit Price Cost Unit Price Cost				Unit Price Cost Unit Price Cost				Unit Price Cost Unit Price Cost			
TASK DESCRIPTION										EA				EA				EA				EA				EA			
Digital Output										H/O/A & Control Relay				28				77											
Analog Output																													
Digital Input										Pressure Switch (Elec)				28				52				\$208				\$456			
										Pressure Switch (Plum)				24				51				\$203				\$390			
										Diff. Pressure Sw. (Filter)				26				71											
										Level Switch				26				136											
										Status Relay				26				41				\$186				\$363			
Analog Input										PSIG/PSID (Elec)				26				202											
										PSIG/PSID (Plum)				24				55											
										Amp.				12.4				122				\$365				\$684			
TOTAL THIS SHEET																						\$941				\$1,892			

COST ESTIMATE

BUILDING 183

COST ESTIMATE ANALYSIS

PROJECT										INVITATION NO./CONTRACT NO.										EFFECTIVE PRICING		DATE PREPARED	
LOCATION										DACA41-92-C-0098										MARCH 1993		29-Mar-93	
BLDG. NO.										CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/>										DRAWING NO.		SHT OF	
SEWAGE										LABOR										ESTIMATOR		CHECKED BY	
SYS. NO.										MH/ Unit										TOTAL		SHIPPING	
TASK DESCRIPTION										Total Hrs										Unit		Wt	
Digital Output										EA 3										77			
Analog Output																							
Digital Input										EA 2										52			
Pressure Switch (Elec)										EA 2										51			
Pressure Switch (Plum)										EA 3										71			
Diff. Pressure Sw. (Filter)										1 EA 4										3.9		\$101	
Level Switch										2 EA 2										3.8		\$98	
Status Relay										EA 2										26		111	
Current Switch																							
Analog Input										EA 3										202			
PSIG/PSID (Elec)										EA 2										55			
PSIG/PSID (Plum)										EA 3										737			
Flow (Elec)										EA 2										86			
Flow (Plum)										EA 4										415			
Turbidity																							
TOTAL THIS SHEET																				\$189		\$219	
																						\$418	

COST ESTIMATE

BUILDING 184

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY LOCATION FT. LEONARD WOOD, MISSOURI BLDG. NO. 184										INVITATION NO./CONTRACT NO. DACA41-92-G-0098 CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER <input type="checkbox"/>										EFFECTIVE PRICING MARCH 1993 DRAWING NO.		DATE PREPARED 29-Mar-93 SHT OF	
SEWAGE SYS. NO.		SEW TASK DESCRIPTION		Quantity No. Of Units		LABOR MH/ Unit Total Hrs		EQUIPMENT Unit Price Cost		MATERIAL Unit Price Cost		ESTIMATOR KC TOTAL		CHECKED BY CEL SHIPPING Unit Wt									
Digital Output		H/O/A & Control Relay		EA 3		28				77													
Analog Output																							
Digital Input				EA 2		26				52													
D11-2		Pressure Switch (Elec)		EA 2		24				51													
D16		Pressure Switch (Plum)		EA 3		26				71													
D110		Diff. Pressure Sw. (Filter)		EA 4		3.9		\$101		136		\$237											
D13		Level Switch		EA 2		1.9		\$49		41		\$91											
		Status Relay		EA 2		3.8		\$98		111		\$320											
		Current Switch																					
Analog Input				EA 3		26				202													
U13-2		PSIG/PSID (Elec)		EA 2		24				55													
U15-1		PSIG/PSID (Plum)		EA 3		26				737													
U15-2		Flow (Elec)		EA 2		24				86													
U11-1		Flow (Plum)		EA 3		3.1		\$81		222		\$303											
U11-1		Temp. Water (Elec)		EA 3		3.1		\$81		222		\$303											
U11-1		Temp. Water (Elec)		EA 3		3.1		\$81		222		\$303											
TOTAL THIS SHEET								\$410				\$843		\$1,253									

COST ESTIMATE

BUILDING 185

COST ESTIMATE ANALYSIS

PROJECT										INVITATION NO./CONTRACT NO.				EFFECTIVE PRICING		DATE PREPARED			
EMCS FEASIBILITY STUDY										DACA41-92-C-0098				MARCH 1993		29-Mar-93			
LOCATION FT. LEONARD WOOD, MISSOURI										CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/>				DRAWING NO.		SHT OF			
BLDG. NO. 185										OTHER <input type="checkbox"/>				ESTIMATOR		CHECKED BY			
SEWAGE LIFT STATION										LABOR				EQUIPMENT		MATERIAL		TOTAL	
SYS. NO. SEW										Quantity		MH/		Total		Unit		Unit	
TASK DESCRIPTION										No. Of		Unit		Hrs		Price		Price	
H/O/A & Control Relay										EA		3		26		77			
Digital Output																			
Analog Output																			
Digital Input										EA		2		26		52			
Pressure Switch (Elec)										EA		2		24		51			
Pressure Switch (Plum)										EA		3		26		71			
Diff. Pressure Sw. (Filter)										1		EA		3.9		136		\$237	
Level Switch										EA		4		26		41			
Status Relay										EA		2		26		111		\$840	
Current Switch										4		EA		7.6		197		\$443	
Analog Input										2		EA		6.3		202		\$566	
PSIG/PSID (Elec)										2		EA		4.3		55		\$213	
PSIG/PSID (Plum)										EA		3		26		737			
Flow (Elec)										EA		2		24		86			
Flow (Plum)																			
TOTAL THIS SHEET																		\$1,093	
																		\$1,855	

COST ESTIMATE

BUILDING 186

COST ESTIMATE

BUILDING 187

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY										INVITATION NO./CONTRACT NO.				EFFECTIVE PRICING		DATE PREPARED													
LOCATION FT. LEONARD WOOD, MISSOURI										DACA41-92-C-0098				MARCH 1993		26-Mar-93													
BLDG. NO. 187										<input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER				DRAWING NO.		SHT OF													
SEWAGE LIFT STATION										LABOR				EQUIPMENT		MATERIAL		ESTIMATOR		KC		CHECKED BY		CEL					
SYS. NO.										Quantity		MH/		Total		Unit		Unit		Unit		Unit		Unit					
TASK DESCRIPTION										No. Of		Unit		Hrs		Price		Cost		Unit		Unit		Unit		Unit			
H/O/A & Control Relay										EA		3		26															
Digital Output																													
Analog Output																													
Digital Input																													
Pressure Switch (Elec)										EA		2		26															
Pressure Switch (Plum)										EA		2		24															
Diff. Pressure Sw. (Filter)										EA		3		26															
Level Switch										1 EA		4		3.9		26		\$101											
Status Relay										4 EA		2		7.6		26		\$197											
Current Switch										EA		2		26															
Analog Input																													
PSIG/PSID (Elec)										2 EA		3		6.3		26		\$161											
PSIG/PSID (Plum)										2 EA		2		4.3		24		\$104											
Flow (Elec)										EA		3		26															
Flow (Plum)										EA		2		24															
TOTAL THIS SHEET																		\$563											

COST ESTIMATE

BUILDING 193

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY										INVITATION NO./CONTRACT NO.										EFFECTIVE PRICING										DATE PREPARED																																																																																									
LOCATION FT. LEONARD WOOD, MISSOURI										DACA41-92-C-0098										MARCH 1993										29-Mar-93																																																																																									
BLDG. NO. 193										<input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER										DRAWING NO.										SHT OF																																																																																									
SEWAGE LIFT STATION										LABOR										EQUIPMENT										MATERIAL										ESTIMATOR										KC										CHECKED BY CEL																																																											
SYS. NO.										TASK DESCRIPTION										MH/ Unit										Total Hrs										Unit Price										Cost										Unit Price										Cost										Total										Unit Wt										Total Wt																			
Digital Output										H/O/A & Control Relay										0 EA										3										0.0										26										\$0										77										\$0																																							
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COST ESTIMATE

BUILDING 194

COST ESTIMATE ANALYSIS

[illegible]

COST ESTIMATE

BUILDING 195

COST ESTIMATE

BUILDING 196

COST ESTIMATE

BUILDING 198

COST ESTIMATE

BUILDING 199

COST ESTIMATE

BUILDING 320

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY										INVITATION NO./CONTRACT NO.				EFFECTIVE PRICING		DATE PREPARED	
LOCATION FT. LEONARD WOOD, MISSOURI										DACA41-92-C-0098				MARCH 1993		16-Mar-93	
BLDG. NO. 320										<input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER				DRAWING NO.		SHT OF	
AIR COOLED DX COMPRESSOR										ESTIMATOR				KC		CHECKED BY CEL	
SYS. NO. ACCU-2										MATERIAL				TOTAL		SHIPPING	
TASK DESCRIPTION										Unit Price				Cost		Unit Total Wt	
Digital Output										43				\$43		\$99	
Analog Output																	
Digital Input										41				\$41		\$91	
Analog Input																	
TOTAL THIS SHEET														\$85		\$190	

COST ESTIMATE ANALYSIS

[illegible]

COST ESTIMATE

BUILDING 404

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY										INVITATION NO./CONTRACT NO.										EFFECTIVE PRICING		DATE PREPARED	
LOCATION FT. LEONARD WOOD, MISSOURI										DACA41-92-C-0098										MARCH 1993		25-Mar-93	
BLDG. NO. 404										<input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER										DRAWING NO.		SHT OF	
AIR COOLED CHILLER										EQUIPMENT										ESTIMATOR		CHECKED BY	
SYS. NO. CH-1										MATERIAL										TOTAL		SHIPPING	
TASK DESCRIPTION										Unit Price Cost										Unit Cost		Unit Wt	
Digital Output										1 EA 2 2.2 26 \$56										43 \$99			
Analog Output																							
Digital Input										1 EA 2 2.4 26 \$62										52 \$114			
										1 EA 2 1.9 24 \$47										51 \$97			
										2 EA 2 3.8 26 \$98										41 \$181			
Analog Input																							
										2 EA 3 6.3 26 \$161										222 \$805			
										2 EA 2 4.3 24 \$104										65 \$234			
TOTAL THIS SHEET										\$528										\$803		\$1,331	

COST ESTIMATE ANALYSIS

COST ESTIMATE ANALYSIS										INVITATION NO./CONTRACT NO. DACA41-92-C-0098 <input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER _____						EFFECTIVE PRICING MARCH 1993 DRAWING NO.		DATE PREPARED 25-Mar-93 SHT OF						
PROJECT EMCS FEASIBILITY STUDY		LOCATION FT. LEONARD WOOD, MISSOURI		BLDG. NO. 404		HOT WATER BOILER		SYS. NO. BLR-1		TASK DESCRIPTION		Quantity		LABOR		EQUIPMENT		MATERIAL		ESTIMATOR KG TOTAL		CHECKED BY CEL SHIPPING		
No. Of Units	Unit Meas	MH/ Unit	Total Hrs	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost	
Digital Output	Control Relay	1	EA	2	2.2	26	\$56																	
Analog Output	CPA (Electric)	1	EA	4	4.1	26	\$106																	
Digital Input	Pressure Switch (Elec)			2		26																		
	Pressure Switch (Plum)	1	EA	2	1.9	24	\$47																	
	Auxiliary Contact	1	EA	2	1.9	26	\$49																	
	Status Relay	1	EA	2	1.9	26	\$49																	
Analog Input	Temp. Water (Elec)	2	EA	3	6.3	26	\$161																	
	Temp. Water (Plum)	2	EA	2	4.3	24	\$104																	
TOTAL THIS SHEET																								

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COST ESTIMATE

BUILDING 498

COST ESTIMATE ANALYSIS

COST ESTIMATE ANALYSIS										INVITATION NO./CONTRACT NO. DACA41-92-C-0098 <input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER _____						EFFECTIVE PRICING MARCH 1993 DRAWING NO.		DATE PREPARED 25-Mar-93 SHT OF	
PROJECT EMCS FEASIBILITY STUDY LOCATION FT. LEONARD WOOD, MISSOURI BLDG. NO. 498									ESTIMATOR		KC	TOTAL	CHECKED BY CEL						
MULTIZONE AHU SYS. NO. AHU-3		Quantity		LABOR		EQUIPMENT		MATERIAL					Total						
TASK DESCRIPTION		No. Of Units	Unit Meas	MH/ Unit	Total Hrs	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost		Unit	Wt	Total Wt				
Digital Output	Control Relay	1	EA	2	2.2	26	\$56			43	\$43								
	H/O/A & Control Relay		EA	3		26				77									
Analog Output	CPA (Damper)	6	EA	3	18.8	26	\$483			295	\$1,771								
	CPA (Valve)	2	EA	3	6.3	26	\$161			295	\$590								
Digital Input	Diff. Pressure Sw. (Fan)	1	EA	3	3.4	26	\$98			71	\$71								
	Diff. Pressure Sw. (Filter)	1	EA	3	3.4	26	\$98			71	\$71								
	End Position Switch		EA	2		26				69									
Analog Input	Temp. Space	5	EA	3	13.1	26	\$338			174	\$870								
	Temp. Duct	2	EA	3	6.3	26	\$161			185	\$370								
	Temp. Avg. Duct	2	EA	4	7.3	26	\$187			190	\$380								
	RH Space	1	EA	3	2.6	26	\$68			240	\$240								
	Position	1	EA	3	3.1	26	\$81			191	\$191								
TOTAL THIS SHEET							\$1,711								\$4,597	\$6,307			

PAGE

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COST ESTIMATE ANALYSIS

[illegible]

COST ESTIMATE ANALYSIS

INVITATION NO./CONTRACT NO.										EFFECTIVE PRICING		DATE PREPARED	
DACA41-92-C-0098										MARCH 1993		25-Mar-93	
<div> <div>CODE A <input checked="" type="checkbox"/></div> <div>CODE B <input type="checkbox"/></div> <div>CODE C <input type="checkbox"/></div> <div>OTHER <input type="checkbox"/></div> </div>										DRAWING NO.		SHT OF	
										ESTIMATOR		KC	
										TOTAL		CHECKED BY	
										UNIT		SHIPPING	
										WT		WT	
PROJECT EMCS FEASIBILITY STUDY LOCATION FT. LEONARD WOOD, MISSOURI BLDG. NO. 496													
AIR COOLED DX COMPRESSOR SY.S. NO. ACCU-2 TASK DESCRIPTION Digital Output Control Relay										43		\$99	
Analog Output													
Digital Input										41		\$91	
Analog Input													
TOTAL THIS SHEET												\$105	
										\$85		\$190	

COST ESTIMATE ANALYSIS

COST ESTIMATE ANALYSIS						INVITATION NO./CONTRACT NO.							EFFECTIVE PRICING		DATE PREPARED	
PROJECT EMCS FEASIBILITY STUDY		LOCATION FT. LEONARD WOOD, MISSOURI				DACA41-92-C-0098							MARCH 1993		25-Mar-93	
BLDG. NO. 498						<input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C		<input type="checkbox"/> OTHER				DRAWING NO.		SHT OF		
AIR COOLED DX COMPRESSOR		Quantity		LABOR		EQUIPMENT		MATERIAL		ESTIMATOR		KC	CHECKED BY		CEL	
SYS. NO.	CH-3	No. Of Units	M/H Unit	Total Hrs	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost	TOTAL	Unit	Wt	Total	Shipping	
TASK DESCRIPTION																
Digital Output	Control Relay	1 EA	2	2.2	26	\$56			43	\$43	\$99					
Analog Output																
Digital Input	Status Relay	1 EA	2	1.9	26	\$49			41	\$41	\$91					
Analog Input																
TOTAL THIS SHEET						\$105					\$85			\$190	PAGE	

COST ESTIMATE

BUILDING 604

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY LOCATION FT. LEONARD WOOD, MISSOURI BLDG. NO. 604 PUMP										INVITATION NO./CONTRACT NO. DACA41-92-C-0098 CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER <input type="checkbox"/>				EFFECTIVE PRICING MARCH 1993 DRAWING NO.		DATE PREPARED 25-Mar-93 SHT OF	
SYS. NO. PUMP TASK DESCRIPTION										ESTIMATOR		KC TOTAL		CHECKED BY CEL			
Quantity No. Of Units 1 EA										LABOR MH/ Unit 2		Total Hrs 2.2		Unit Price 26		Cost \$56	
Digital Output										Unit Price 43		Cost \$43		Total Wt \$99			
Analog Output																	
Digital Input										71		\$71		\$159			
Analog Input																	
TOTAL THIS SHEET												\$144				\$114	
																\$258	

COST ESTIMATE

BUILDING 625
AND TYPICAL FOR
658 & 825

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY LOCATION FT. LEONARD WOOD, MISSOURI BLDG. NO. 625										INVITATION NO./CONTRACT NO. DACA41-92-C-0098 CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER <input type="checkbox"/>				EFFECTIVE PRICING MARCH 1993 DRAWING NO.		DATE PREPARED 25-Mar-93 SHT OF	
ELECTRIC DW HEATER SYS. NO. DHW-1 TASK DESCRIPTION H/O/A & Control Relay										ESTIMATOR		KC		CHECKED BY CEL			
Quantity No. Of Units 1										LABOR M/H- Unit 3 Total Hrs 2.9		EQUIPMENT Unit Price 26		MATERIAL Unit Price 77		TOTAL Unit Wt \$152	
Digital Output										Cost \$75		Cost \$77		Cost \$152		Cost \$152	
Analog Output																	
Digital Input										Cost \$49		Cost \$41		Cost \$91		Cost \$91	
Analog Input																	
TOTAL THIS SHEET										\$124		\$118		\$242		\$242	

COST ESTIMATE

BUILDING 627
AND TYPICAL FOR
628, 629, 634, 635, 651
652, 654, 659, AND 660

COST ESTIMATE ANALYSIS

INVESTMENT NO./CONTRACT NO.										EFFECTIVE PRICING		DATE PREPARED	
DACA41-92-C-0098										MARCH 1993		25-Mar-93	
<div> <div>CODE A <input checked="" type="checkbox"/></div> <div>CODE B <input type="checkbox"/></div> <div>CODE C <input type="checkbox"/></div> <div>OTHER <input type="checkbox"/></div> </div>										DRAWING NO.		SHT OF	
										ESTIMATOR		KC	
										CHECKED BY		CEL	
										SHIPPING			
										Unit		Wt	
										Total		Wt	
PROJECT EMCS FEASIBILITY STUDY													
LOCATION FT. LEONARD WOOD, MISSOURI													
BLDG. NO. 627													
STEAM HW CONVERTER													
SYS. NO. CV-1													
TASK DESCRIPTION													
Control Relay													
Digital Output													
Analog Output													
Digital Input													
Pressure Switch (Elec)													
Pressure Switch (Plum)													
Analog Input													
Temp. Water (Elec)													
Temp. Water (Plum)													
TOTAL THIS SHEET													

COST ESTIMATE ANALYSIS

PROJECT										INVITATION NO./CONTRACT NO.										EFFECTIVE PRICING		DATE PREPARED			
EMCS FEASIBILITY STUDY										DACA41-92-C-0098										MARCH 1993		25-Mar-93			
LOCATION FT. LEONARD WOOD, MISSOURI										CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/>										DRAWING NO.		SHT OF			
BLDG. NO. 627										OTHER															
STEAM/HW CONVERTER										EQUIPMENT										ESTIMATOR		CHECKED BY			
SYS. NO. CV-2										MATERIAL										KC		CEL			
TASK DESCRIPTION										LABOR										TOTAL		SHIPPING			
No. Of Units										M/H/ Unit										Unit Price		Unit Wt			
1 EA										2 2.2										26					
Digital Output										Control Relay										\$56		43		\$99	
Analog Output										CPA (Electric)										\$108		295		\$402	
Digital Input										Pressure Switch (Elec)										\$62		52		\$114	
										Pressure Switch (Plum)										\$47		51		\$97	
Analog Input										Temp. Water (Elec)										\$81		222		\$303	
										Temp. Water (Plum)										\$52		65		\$117	
TOTAL THIS SHEET																				\$403				\$1,132	

COST ESTIMATE ANALYSIS

INVESTMENT NO./CONTRACT NO.										EFFECTIVE PRICING		DATE PREPARED		
DACA41-92-C-0098										MARCH 1993		05-Apr-93		
<div> <div>CODE A <input checked="" type="checkbox"/></div> <div>CODE B <input type="checkbox"/></div> <div>CODE C <input type="checkbox"/></div> <div>OTHER <input type="checkbox"/></div> </div>										DRAWING NO.		SHT OF		
ESTIMATOR										KC		CHECKED BY CEL		
MATERIAL										TOTAL		SHIPPING		
Unit Price										Cost		Unit Wt		
Total										Total		Total		
PROJECT	EMCS FEASIBILITY STUDY													
LOCATION	FT. LEONARD WOOD, MISSOURI													
BLDG. NO.	627													
STEAM/HW CONVERTER		Quantity		LABOR		EQUIPMENT		MATERIAL		TOTAL		SHIPPING		
SYS. NO.	CV-3	No. Of Units	Unit Meas	MH/ Unit	Total Hrs	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost	Unit Wt	Total Wt	
Digital Output	Control Relay	1	EA	2	2.2	26	\$56			43	\$43		\$99	
Analog Output	CPA (Electric)	1	EA	4	4.1	26	\$106			295	\$295		\$402	
Digital Input	Pressure Switch (Elec)	1	EA	2	2.4	26	\$62			52	\$52		\$114	
	Pressure Switch (Plum)	1	EA	2	1.9	24	\$47			51	\$51		\$97	
Analog Input	Temp. Water (Elec)	1	EA	3	3.1	26	\$81			222	\$222		\$303	
	Temp. Water (Plum)	1	EA	2	2.1	24	\$52			65	\$65		\$117	
TOTAL THIS SHEET											\$403		\$728	\$1,132

COST ESTIMATE ANALYSIS

[illegible]

COST ESTIMATE ANALYSIS

INVITATION NO./CONTRACT NO.

DACA41-92-C-0098

EFFECTIVE PRICING

MARCH 1993

DATE PREPARED

25-Mar-93

PROJECT EMCS FEASIBILITY STUDY

LOCATION	FT. LEONARD WOOD, MISSOURI
1. Name of the person or persons to whom the report is made	1. Name of the person or persons to whom the report is made
2. Name of the person or persons making the report	2. Name of the person or persons making the report
3. Title of the person or persons making the report	3. Title of the person or persons making the report
4. Date of the report	4. Date of the report
5. Title of the report	5. Title of the report
6. Summary of the report	6. Summary of the report
7. Details of the report	7. Details of the report
8. Remarks	8. Remarks

BLDG. NO. 627

CODE A	X	CODE B	CODE C

OTHER

SHT OF

DRAWING NO.

LOCATION	PT. LEON
BLDG. NO.	627
PERIMETER RADIATION	

TASK DESCRIPTION

Digital Output

Analog Output

Digital Input

Analogue Input

TOTAL THIS SHEET

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PAGE

COST ESTIMATE

BUILDING 630
AND TYPICAL FOR
653, 657, 820, 836, 1027

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY										INVITATION NO./CONTRACT NO.				EFFECTIVE PRICING		DATE PREPARED	
LOCATION FT. LEONARD WOOD, MISSOURI										DACA41-92-C-0098				MARCH 1993		25-Mar-93	
BLDG. NO. 630Z1										<input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER				DRAWING NO.		SHT OF	
DUAL TEMP WATER PUMP										ESTIMATOR				KC		CHECKED BY CEL	
SYS. NO. DTW PUMP										MATERIAL				TOTAL		SHIPPING	
TASK DESCRIPTION										Unit Price				Cost		Unit Wt	
Digital Output										43				\$43		\$99	
Analog Output																	
Digital Input										52				\$52		\$114	
Pressure Switch (Elec)										51				\$51		\$97	
Pressure Switch (Plum)																	
Analog Input										174				\$348		\$483	
Temp. Space										222				\$444		\$605	
Temp. Water (Elec)										65				\$130		\$234	
Temp. Water (Plum)																	
TOTAL THIS SHEET														\$1,068		\$1,639	

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY										INVITATION NO./CONTRACT NO.				EFFECTIVE PRICING		DATE PREPARED	
LOCATION FT. LEONARD WOOD, MISSOURI										DACA41 -92-C-0098				MARCH 1993		25-Mar-93	
BLDG. NO. 63021										<input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER				DRAWING NO.		SHT OF	
STEAM HW CONVERTER		Quantity		LABOR		EQUIPMENT		MATERIAL		ESTIMATOR		KC		CHECKED BY		CEL	
SYS. NO.	TASK DESCRIPTION	No. Of Units	Unit Meas	MH/ Unit	Total Hrs	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost	TOTAL	Unit Wt	SHIPPING	Unit Wt	Total Wt	
Digital Output	Control Relay	1	EA	2	2.2	26	\$56					\$43	\$99				
Analog Output	CFA (Electric)	1	EA	4	4.1	26	\$106					\$295	\$402				
Digital Input	Pressure Switch (Elec)	1	EA	2	2.4	26	\$62					\$52	\$114				
	Pressure Switch (Plum)	1	EA	2	1.9	24	\$47					\$51	\$97				
Analog Input	Temp. Water (Elec)	1	EA	3	3.1	26	\$81					\$222	\$303				
	Temp. Water (Plum)	1	EA	2	2.1	24	\$52					\$65	\$117				
TOTAL THIS SHEET							\$403					\$728	\$1,132				

COST ESTIMATE
BUILDINGS 636 & 741

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY LOCATION FT. LEONARD WOOD, MISSOURI BLDG. NO. 636										INVITATION NO./CONTRACT NO. DACA41-92-C-0098 <input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER				EFFECTIVE PRICING MARCH 1993 DRAWING NO.		DATE PREPARED 25-Mar-93 SHT OF			
FAN COIL SYS. NO. FC-1 TASK DESCRIPTION Control Relay										LABOR MH/ Unit Total Hrs 2 2.2 26		EQUIPMENT Unit Price Cost		MATERIAL Unit Price Cost		ESTIMATOR KC TOTAL		CHECKED BY CEL SHIPPING Unit Wt	
Digital Output										1 EA		26		26		43		\$99	
Analog Output										1 EA		3.6		26		415		\$508	
Digital Input																			
Analog Input										1 EA		2.6		26		50		\$117	
Temp. Space (RTD Only)																			
TOTAL THIS SHEET																\$508		\$725	

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY LOCATION FT. LEONARD WOOD, MISSOURI BLDG. NO. 636										INVITATION NO./CONTRACT NO. DACA41-92-C-0098 CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER <input type="checkbox"/>					EFFECTIVE PRICING MARCH 1993 DRAWING NO.		DATE PREPARED 25-Mar-93 SHT OF		
STEAM HW CONVERTER SYS. NO. CV-1 TASK DESCRIPTION Control Relay										LABOR Total Hrs 2.2 Unit Price 26		EQUIPMENT Unit Price Cost		MATERIAL Unit Price Cost		ESTIMATOR KC TOTAL \$43 \$99		CHECKED BY CEL SHIPPING Unit Wt	
Digital Output No. Of Units 1 Unit Meas EA Total Hrs 2.2 Unit Price 26 Cost \$56																			
Analog Output No. Of Units 1 Unit Meas EA Total Hrs 4.1 Unit Price 26 Cost \$106																			
Digital Input No. Of Units 1 Unit Meas EA Total Hrs 2.4 Unit Price 26 Cost \$62																			
Pressure Switch (Elec) No. Of Units 1 Unit Meas EA Total Hrs 1.9 Unit Price 24 Cost \$47																			
Analog Input No. Of Units 1 Unit Meas EA Total Hrs 3.1 Unit Price 26 Cost \$81																			
Temp. Water (Elec) No. Of Units 1 Unit Meas EA Total Hrs 2.1 Unit Price 24 Cost \$52																			
Temp. Water (Plum) No. Of Units 1 Unit Meas EA Total Hrs Unit Price Cost																			
TOTAL THIS SHEET																		\$403 \$728 \$1,132	

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY										INVITATION NO./CONTRACT NO.				EFFECTIVE PRICING		DATE PREPARED	
LOCATION FT. LEONARD WOOD, MISSOURI										DACA41-92-C-0098				MARCH 1993		25-Mar-93	
BLDG. NO. 636										<input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER				DRAWING NO.		SHT OF	
UNIT HEATER										ESTIMATOR				KC		CHECKED BY CEL	
SYS. NO. UH-1										MATERIAL				TOTAL		SHIPPING	
TASK DESCRIPTION										Unit Price				Cost		Unit Wt	
Digital Output										43				\$43		\$99	
Analog Output																	
Digital Input										43				\$43		\$92	
Analog Input																	
Temp. Space										174				\$174		\$242	
TOTAL THIS SHEET														\$260		\$433	

COST ESTIMATE

BUILDING 637

COST ESTIMATE ANALYSIS

COST ESTIMATE ANALYSIS										INVITATION NO./CONTRACT NO. DACA41-92-C-0098				EFFECTIVE PRICING MARCH 1993		DATE PREPARED 26-Mar-93	
PROJECT		EMGS FEASIBILITY STUDY								DRAWING NO.				SHT		OF	
LOCATION BLDG. NO.		FT. LEONARD WOOD, MISSOURI 637								CODE A <input type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/>				ESTIMATOR		CHECKED BY	
SYS. NO.		SINGLE ZONE & VAV AHU AHU-1								MATERIAL				EQUIPMENT		TOTAL	
TASK DESCRIPTION		Quantity		LABOR		EQUIPMENT		MATERIAL		ESTIMATOR		TOTAL		CHECKED BY		CEL	
		No. Of Units	Unit Meas	MH/ Unit	Total Hrs	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost
Digital Output	Control Relay	1	EA	2	2.2	26	\$56			43	\$43		\$99				
	H/O/A & Control Relay		EA	3		26				77							
Analog Output	CPA (Damper)	1	EA	3	3.1	26	\$81			295	\$295		\$376				
	CPA (Valve)	2	EA	3	6.3	26	\$161			295	\$590		\$752				
Digital Input	Diff. Pressure Sw. (Fan)	1	EA	3	3.4	26	\$88			71	\$71		\$159				
	Diff. Pressure Sw. (Filter)	1	EA	3	3.4	26	\$88			71	\$71		\$159				
	End Position Switch		EA	2		26				69							
Analog Input	Temp. Space	2	EA	3	5.3	26	\$135			174	\$348		\$483				
	Temp. Avg. Duct	1	EA	4	3.6	26	\$93			190	\$190		\$283				
	Position	1	EA	3	3.1	26	\$81			191	\$191		\$271				
	Temp. Duct	2	EA	3	6.3	26	\$161			185	\$370		\$531				
TOTAL THIS SHEET							\$944						\$2,169				\$3,113

COST ESTIMATE ANALYSIS

COST ESTIMATE ANALYSIS										INVITATION NO./CONTRACT NO.						EFFECTIVE PRICING		DATE PREPARED	
PROJECT		EMCS FEASIBILITY STUDY								DACA41-92-C-0098						MARCH 1993		26-Mar-93	
LOCATION		FT. LEONARD WOOD, MISSOURI								<input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C		DRAWING NO.				SHT OF			
BLDG. NO.		637								<input type="checkbox"/> OTHER		ESTIMATOR		KC		CHECKED BY		CEL	
STEAM HW CONVERTER		SYS. NO.		CV-1		LABOR		QUANTITY		EQUIPMENT		MATERIAL		TOTAL		SHIPPING			
TASK DESCRIPTION		No. Of Units	MH/ Unit	Total Hrs	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost	Unit	Wt	Total Wt		
Digital Output	Control Relay	1	EA	2	2.2	26	\$56						43	\$99					
Analog Output	CPA (Electric)	1	EA	4	4.1	26	\$106						295	\$402					
Digital Input	Pressure Switch (Elec)	1	EA	2	2.4	26	\$62						52	\$114					
	Pressure Switch (Plum)	1	EA	2	1.9	24	\$47						51	\$97					
Analog Input	Temp. Water (Elec)	1	EA	3	3.1	26	\$81						222	\$303					
	Temp. Water (Plum)	1	EA	2	2.1	24	\$52						65	\$117					
TOTAL THIS SHEET							\$403							\$728			\$1,132		

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COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY										INVITATION NO./CONTRACT NO.										EFFECTIVE PRICING		DATE PREPARED	
LOCATION FT. LEONARD WOOD, MISSOURI										DACA41-92-C-0098										MARCH 1993		26-Mar-93	
BLDG. NO. 637										<input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER										DRAWING NO.		SHT OF	
STEAM HW CONVERTER										ESTIMATOR										KC		CHECKED BY CEL	
SYS. NO. CV-2										MATERIAL										TOTAL		SHIPPING	
TASK DESCRIPTION										Unit Price										Cost		Unit Wt	
Digital Output										43										\$43		\$99	
Analog Output										295										\$295		\$402	
Digital Input										52										\$52		\$114	
Pressure Switch (Elec)										51										\$51		\$97	
Pressure Switch (Plum)																							
Analog Input										222										\$222		\$303	
Temp. Water (Elec)										65										\$65		\$117	
Temp. Water (Plum)																							
TOTAL THIS SHEET																				\$728		\$1,132	

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY										INVITATION NO./CONTRACT NO.				EFFECTIVE PRICING		DATE PREPARED	
LOCATION FT. LEONARD WOOD, MISSOURI										DACA41-92-C-0098				MARCH 1993		26-Mar-93	
BLDG. NO. 637										<input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER				DRAWING NO.		SHT OF	
FAN COIL										ESTIMATOR				KC		CHECKED BY CEL	
SYS. NO. FC-1										MATERIAL				TOTAL		SHIPPING	
TASK DESCRIPTION										Unit Price				Cost		Unit Wt	
Digital Output										43				\$43		\$99	
Analog Output										415				\$415		\$508	
Digital Input																	
Analog Input										50				\$50		\$117	
TOTAL THIS SHEET										\$217				\$508		\$725	

COST ESTIMATE

**BUILDING 638
AND TYPICAL FOR
832 & 1018**

COST ESTIMATE ANALYSIS

COST ESTIMATE ANALYSIS														INVITATION NO./CONTRACT NO.				EFFECTIVE PRICING		DATE PREPARED	
PROJECT		EMCS FEASIBILITY STUDY		DACA41-92-C-0098										MARCH 1993		26-Mar-93					
LOCATION		FT. LEONARD WOOD, MISSOURI		DACA41-92-C-0098										DRAWING NO.		SHT OF					
BLDG. NO.		638		CODE A <input type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/>										ESTIMATOR		CHECKED BY					
MULTITZONE AHU		AHU-1		LABOR				EQUIPMENT		MATERIAL		TOTAL		SHIPPING							
SYS. NO.		TASK DESCRIPTION		Quantity		MH/		Unit		Unit		Unit		Unit							
				No. Of	Unit	Total	Unit	Price	Cost	Unit	Price	Cost	Unit	Price	Cost						
				Units	Meas	Hrs	Price	Cost	Unit	Price	Cost	Unit	Price	Cost	Unit						
Digital Output	Control Relay	1	EA	2	2.2	26	\$56						43	\$43	\$99						
	H/O/A & Control Relay		EA	3		26							77								
Analog Output																					
	CPA (Damper)	6	EA	3	18.8	26	\$483						295	\$1,771	\$2,255						
	CPA (Valve)	2	EA	3	6.3	26	\$161						295	\$590	\$752						
Digital Input																					
	Diff. Pressure Sw. (Fan)	1	EA	3	3.4	26	\$88						71	\$71	\$159						
	Diff. Pressure Sw. (Filter)	1	EA	3	3.4	26	\$88						71	\$71	\$159						
	End Position Switch		EA	2		26							69								
Analog Input																					
	Temp. Space	5	EA	3	13.1	26	\$338						174	\$870	\$1,208						
	Temp. Duct	2	EA	3	6.3	26	\$161						185	\$370	\$531						
	Temp. Avg. Duct	2	EA	4	7.3	26	\$187						190	\$380	\$567						
	RH Space	1	EA	3	2.6	26	\$68						240	\$240	\$307						
	Position	1	EA	3	3.1	26	\$81						191	\$191	\$271						
TOTAL THIS SHEET																\$1,711				\$4,597	\$6,307

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COST ESTIMATE ANALYSIS

[illegible]

COST ESTIMATE

BUILDING 639

COST ESTIMATE ANALYSIS

PROJECT										INVITATION NO./CONTRACT NO.										EFFECTIVE PRICING		DATE PREPARED			
EMCS FEASIBILITY STUDY										DACA41-92-C-0098										MARCH 1993		26-Mar-93			
LOCATION FT. LEONARD WOOD, MISSOURI										CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/>										DRAWING NO.		SHT OF			
BLDG. NO. 639										OTHER <input type="checkbox"/>										ESTIMATOR		CHECKED BY			
MULTIZONE AHU										EQUIPMENT										MATERIAL		TOTAL		SHIPPING	
SYS. NO. AHU-1										Unit Price										Unit Price		Unit Wt		Total Wt	
TASK DESCRIPTION										Unit Price										Unit Price		Unit Wt		Total Wt	
Digital Output										Unit Price										Unit Price		Unit Wt		Total Wt	
Control Relay										Unit Price										Unit Price		Unit Wt		Total Wt	
H/O/A & Control Relay										Unit Price										Unit Price		Unit Wt		Total Wt	
Analog Output										Unit Price										Unit Price		Unit Wt		Total Wt	
CPA (Damper)										Unit Price										Unit Price		Unit Wt		Total Wt	
CPA (Valve)										Unit Price										Unit Price		Unit Wt		Total Wt	
Digital Input										Unit Price										Unit Price		Unit Wt		Total Wt	
Diff. Pressure Sw. (Fan)										Unit Price										Unit Price		Unit Wt		Total Wt	
Diff. Pressure Sw. (Filter)										Unit Price										Unit Price		Unit Wt		Total Wt	
End Position Switch										Unit Price										Unit Price		Unit Wt		Total Wt	
Analog Input										Unit Price										Unit Price		Unit Wt		Total Wt	
Temp. Space										Unit Price										Unit Price		Unit Wt		Total Wt	
Temp. Duct										Unit Price										Unit Price		Unit Wt		Total Wt	
Temp. Avg. Duct										Unit Price										Unit Price		Unit Wt		Total Wt	
RH Space										Unit Price										Unit Price		Unit Wt		Total Wt	
Position										Unit Price										Unit Price		Unit Wt		Total Wt	
TOTAL THIS SHEET										\$1,711										\$4,597		\$6,307			

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY LOCATION FT. LEONARD WOOD, MISSOURI BLDG. NO. 639										INVITATION NO./CONTRACT NO. DACA41-92-C-0098 <input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER				EFFECTIVE PRICING MARCH 1993 DRAWING NO.		DATE PREPARED 26-Mar-93 SHT OF					
AIR COOLED DX COMPRESSOR SYS. NO. DX-1 TASK DESCRIPTION Control Relay										LABOR No. Of Units 1 EA		QUANTITY Unit 1		MEAS Unit 1		ESTIMATOR KC		CHECKED BY CEL			
Digital Output										Total Hrs 2.2		Unit Price 26		Cost \$56		Unit Price 43		Cost \$43		Total \$99	
Analog Output																					
Digital Input										Total Hrs 1.9		Unit Price 26		Cost \$49		Unit Price 41		Cost \$41		Total \$91	
Analog Input																					
TOTAL THIS SHEET												\$105				\$85		\$190			

COST ESTIMATE ANALYSIS

[illegible]

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY										INVITATION NO./CONTRACT NO. DACA41-92-C-0098										EFFECTIVE PRICING MARCH 1993		DATE PREPARED 26-Mar-93			
LOCATION FT. LEONARD WOOD, MISSOURI										<input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER										DRAWING NO.		SHT OF			
BLDG. NO. 639																				ESTIMATOR		CHECKED BY			
ELECTRIC DW HEATER										EQUIPMENT										MATERIAL		TOTAL			
SYS. NO. DHW-1										Unit Price										Unit Price		Unit Wt			
TASK DESCRIPTION										Unit Price										Unit Price		Unit Wt			
H/O/A & Control Relay										Unit Price										Unit Price		Unit Wt			
Digital Output										1 EA										26		\$75		\$152	
Analog Output																									
Digital Input										1 EA										26		\$49		\$91	
Analog Input																									
TOTAL THIS SHEET																				\$124		\$118		\$242	

COST ESTIMATE

BUILDING 650
AND TYPICAL FOR
732, 740, 750, 753,
822, 838, 842, 1022, & 1023

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY										INVITATION NO./CONTRACT NO. DACA41-92-C-0098				EFFECTIVE PRICING MARCH 1993		DATE PREPARED 26-Mar-93					
LOCATION FT. LEONARD WOOD, MISSOURI										<input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER				DRAWING NO.		SHT OF					
BLDG. NO. 650														ESTIMATOR		KC		CHECKED BY		CEL	
STEAM HW CONVERTER		Quantity		LABOR				EQUIPMENT		MATERIAL		TOTAL		SHIPPING							
SYS. NO.	TASK DESCRIPTION	No. Of Units	Unit Meas	MH/ Unit	Total Hrs	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost	Unit Price	Total Wt						
Digital Output	Control Relay	1	EA	2	2.2	26	\$56					43	\$43		\$99						
Analog Output	CPA (Electric)	1	EA	4	4.1	26	\$106					295	\$295		\$402						
Digital Input	Pressure Switch (Elec)	1	EA	2	2.4	26	\$62					52	\$52		\$114						
	Pressure Switch (Plum)	1	EA	2	1.9	24	\$47					51	\$51		\$97						
Analog Input	Temp. Water (Elec)	1	EA	3	3.1	26	\$81					222	\$222		\$303						
	Temp. Water (Plum)	1	EA	2	2.1	24	\$52					65	\$65		\$117						
TOTAL THIS SHEET							\$403						\$728		\$1,132						

COST ESTIMATE

BUILDING 655
AND TYPICAL FOR
626, 633, 656, 733, 734,
751, 752, 823, 824, 840, AND 841

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY LOCATION FT. LEONARD WOOD, MISSOURI BLDG. NO. 655										INVITATION NO./CONTRACT NO. DACA41-92-C-0098 <input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER				EFFECTIVE PRICING MARCH 1993 DRAWING NO.		DATE PREPARED 28-Mar-93 SHT OF																	
STEAM/HW CONVERTER CV-1 TASK DESCRIPTION Digital Output										LABOR No. Of Units 1 EA		MH/ Unit 2		Total Hrs 2.2		Unit Price 26		Cost \$56		EQUIPMENT Unit Price 43		Cost \$43		MATERIAL Unit Price 295		Cost \$295		TOTAL \$402		ESTIMATOR KC		CHECKED BY CEL	
Analog Output										1 EA		4		4.1		26		\$106		295		\$295		\$402									
Digital Input										1 EA		2		2.4		26		\$62		52		\$52		\$114									
Pressure Switch (Elec)										1 EA		2		1.9		24		\$47		51		\$51		\$97									
Pressure Switch (Plum)																																	
Temp. Water (Elec)										1 EA		3		3.1		26		\$81		222		\$222		\$303									
Temp. Water (Plum)										1 EA		2		2.1		24		\$52		65		\$65		\$117									
TOTAL THIS SHEET																		\$403				\$728		\$1,132									

COST ESTIMATE ANALYSIS

COST ESTIMATE ANALYSIS										INVITATION NO./CONTRACT NO. DACA41-92-C-0098						EFFECTIVE PRICING MARCH 1993		DATE PREPARED 26-Mar-93	
PROJECT EMCS FEASIBILITY STUDY LOCATION FT. LEONARD WOOD, MISSOURI BLDG. NO. 655										CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> <input type="checkbox"/> OTHER _____						DRAWING NO.		SHT OF	
PERIMETER RADIATION SYS. NO. RD - 1																ESTIMATOR		CHECKED BY CEL	
TASK DESCRIPTION										LABOR		EQUIPMENT		MATERIAL		TOTAL		SHIPPING	
No. Of Units		Quantity Unit Meas		M/H Unit	Total Hrs	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost	Unit	Wt	Total	Wt		
Digital Output																			
Analog Output	1	EA	3	3.1	26	\$81						295	\$295			\$376			
	1	EA	4	3.6	26	\$93						415	\$415			\$508			
Digital Input																			
Analog Input	2	EA	3	5.3	26	\$135						174	\$348			\$483			
TOTAL THIS SHEET						\$309							\$1,058			\$1,367			

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COST ESTIMATE

**BUILDING 673
AND TYPICAL FOR
672, 680, 681, 772, 773,
780, 781, 872, 873, 880,
881, 990, 991, 998, AND 999**

COST ESTIMATE ANALYSIS

[illegible]

COST ESTIMATE ANALYSIS

[illegible]

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY LOCATION FT. LEONARD WOOD, MISSOURI BLDG. NO. 673										INVITATION NO./CONTRACT NO. DACA41-92-C-0098 <input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER				EFFECTIVE PRICING MARCH 1993 DRAWING NO.		DATE PREPARED 26-Mar-93 SHT OF			
ELECTRIC DW HEATER SYS. NO. DHW-1 TASK DESCRIPTION Digital Output H/O/A & Control Relay										LABOR Total Hrs 2.9 MH/ Unit 3 Unit Price 26		EQUIPMENT Unit Price Cost \$75		MATERIAL Unit Price 77 Cost \$77 Total \$152		CHECKED BY CEL SHIPPING Unit Wt			
Analog Output																			
Digital Input										1.9		2		26		41		\$91	
Analog Input																			
TOTAL THIS SHEET																\$118		\$242	

COST ESTIMATE

BUILDING 730
AND TYPICAL FOR
731, 736, 737, AND 738

COST ESTIMATE ANALYSIS

INVITATION NO./CONTRACT NO.										EFFECTIVE PRICING		DATE PREPARED	
DACA41-92-C-0098										MARCH 1993		26-Mar-93	
<div> <input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER </div>										DRAWING NO.		SHT OF	
PERIMETER RADIATION				LABOR		EQUIPMENT		MATERIAL		ESTIMATOR		CHECKED BY	
SYS. NO.	TASK DESCRIPTION	No. Of Units	Unit Meas	MH/ Unit	Total Hrs	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost	Unit Wt	Total Wt
Digital Output													
Analog Output	CPA (Valve)	1	EA	3	3.1	26	\$81			295	\$295		\$376
	ACU (Fan Coll)	1	EA	4	3.6	26	\$93			415	\$415		\$508
Digital Input													
Analog Input	Temp. Space	2	EA	3	5.3	26	\$135			174	\$348		\$483
TOTAL THIS SHEET											\$1,058		\$1,367

COST ESTIMATE ANALYSIS

[illegible]

COST ESTIMATE ANALYSIS

[illegible]

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY										INVITATION NO./CONTRACT NO.										EFFECTIVE PRICING		DATE PREPARED			
LOCATION FT. LEONARD WOOD, MISSOURI										DACA41-92-C-0098										MARCH 1993		26-Mar-93			
BLDG. NO. 730										<input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER										DRAWING NO.		SHT OF			
VENTILATION FAN										LABOR										ESTIMATOR		CHECKED BY			
SYS. NO. EX-2										EQUIPMENT										TOTAL		SHIPPING			
TASK DESCRIPTION										MATERIAL										TOTAL		Unit Wt			
Digital Output										No. Of Units 1 EA Unit Meas 1 EA MH/ Unit 2 Total Hrs 2.2 Unit Price 26 Cost \$56 Unit Price 43 Cost \$43 Total \$99															
Analog Output																									
Digital Input										No. Of Units 1 EA Unit Meas 1 EA MH/ Unit 3 Total Hrs 3.4 Unit Price 26 Cost \$88 Unit Price 71 Cost \$71 Total \$159															
Analog Input																									
TOTAL THIS SHEET																				\$144		\$114		\$258	

COST ESTIMATE

BUILDINGS 735 & 739
SAME AS BUILDING 630,
WITH 3 ADDITIONAL H&Vs

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY										INVITATION NO./CONTRACT NO. DACA41-92-C-0098				EFFECTIVE PRICING MARCH 1993		DATE PREPARED 25-Mar-93	
LOCATION FT. LEONARD WOOD, MISSOURI										CODE A <input type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/>				DRAWING NO.		SHT OF	
BLDG. NO. 735										OTHER <input type="checkbox"/>				ESTIMATOR		CHECKED BY	
AHU										LABOR				MATERIAL		TOTAL	
SYS. NO. HV-3										MH/ Unit				Unit Price		Unit Price	
TASK DESCRIPTION										Total Hrs				Cost		Cost	
Digital Output										1 EA				26		43	
Control Relay										2.2				\$56		\$99	
Analog Output										1 EA				26		295	
CPA (Valve)										3.1				\$81		\$376	
Digital Input										1 EA				26		71	
Diff. Pressure Sw. (Fan)										3.4				\$88		\$159	
Analog Input										2 EA				26		174	
Temp. Space										5.3				\$135		\$483	
TOTAL THIS SHEET														\$360		\$757	
																\$1,117	

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY										INVITATION NO./CONTRACT NO. DACA41-92-C-0098				EFFECTIVE PRICING MARCH 1993		DATE PREPARED 25-Mar-93	
LOCATION FT. LEONARD WOOD, MISSOURI										CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/>				DRAWING NO.		SHT OF	
BLDG. NO. 735										OTHER <input type="checkbox"/>				ESTIMATOR		CHECKED BY CEL	
AHU	SYS. NO.	HV--4	TASK DESCRIPTION	Quantity		LABOR		EQUIPMENT		MATERIAL		TOTAL		SHIPPING			
				No. Of Units	Unit Meas	M/H Unit	Total Hrs	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost	Unit Wt	Total Wt		
Digital Output			Control Relay	1	EA	2	2.2	26				43	\$43	\$99			
Analog Output			CPA (Valve)	1	EA	3	3.1	26				295	\$295	\$376			
Digital Input			Diff. Pressure Sw. (Fan)	1	EA	3	3.4	26				71	\$71	\$159			
Analog Input			Temp. Space	2	EA	3	5.3	26				174	\$348	\$483			
TOTAL THIS SHEET													\$757	\$1,117			

COST ESTIMATE ANALYSIS

PROJECT		EMCS FEASIBILITY STUDY		INVITATION NO./CONTRACT NO.		EFFECTIVE PRICING		DATE PREPARED	
LOCATION		FT. LEONARD WOOD, MISSOURI		DACA41-92-C-0098		MARCH 1993		25-Mar-93	
BLDG. NO.		735		<input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER		DRAWING NO.		SHT OF	
AHU				ESTIMATOR		KC		CHECKED BY CEL	
SYS. NO.		HV-5		MATERIAL		TOTAL		SHIPPING	
TASK DESCRIPTION		No. Of Units		Quantity		LABOR		Unit Price	
		1		EA		Total Hrs		Total Wt	
Digital Output	Control Relay	1	EA	2	2.2	26	\$56	43	\$99
Analog Output	CPA (Valve)	1	EA	3	3.1	26	\$81	295	\$376
Digital Input	Diff. Pressure Sw. (Fan)	1	EA	3	3.4	26	\$88	71	\$159
Analog Input	Temp. Space	2	EA	3	5.3	26	\$135	174	\$483
TOTAL THIS SHEET						\$360			\$1,117

COST ESTIMATE

BUILDING 768

COST ESTIMATE ANALYSIS

COST ESTIMATE ANALYSIS										INVITATION NO./CONTRACT NO. DACA41-92-C-0098				EFFECTIVE PRICING MARCH 1993		DATE PREPARED 26-Mar-93	
PROJECT EMCS FEASIBILITY STUDY		LOCATION FT. LEONARD WOOD, MISSOURI								DRAWING NO.		SHT		OF			
BLDG. NO. 768		SINGLE ZONE & VAV AHU								ESTIMATOR		KC		CHECKED BY CEL			
SYS. NO. AHU-1		TASK DESCRIPTION		Quantity		LABOR		EQUIPMENT		MATERIAL		TOTAL		SHIPPING			
		No. Of Units	Unit Meas	MH/ Unit	Total Hrs	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost			Unit Wt	Total Wt		
Digital Output	Control Relay	1	EA	2	2.2	26	\$56			43	\$99						
	H/O/A & Control Relay		EA	3		26				77							
Analog Output	CPA (Damper)	1	EA	3	3.1	26	\$81			295	\$376						
	CPA (Valve)	2	EA	3	6.3	26	\$161			295	\$752						
Digital Input	Diff. Pressure Sw. (Fan)	1	EA	3	3.4	26	\$88			71	\$159						
	Diff. Pressure Sw. (Filter)	1	EA	3	3.4	26	\$88			71	\$159						
	End Position Switch		EA	2		26				69							
Analog Input	Temp. Space	2	EA	3	5.3	26	\$135			174	\$483						
	Temp. Avg. Duct	1	EA	4	3.6	26	\$93			190	\$283						
	Position	1	EA	3	3.1	26	\$81			191	\$271						
	Temp. Duct	2	EA	3	6.3	26	\$161			185	\$531						
TOTAL THIS SHEET												\$2,169	\$3,113	PAGE			

DA FORM 541B-R, APR 85

COST ESTIMATE ANALYSIS

COST ESTIMATE ANALYSIS										INVITATION NO./CONTRACT NO.				EFFECTIVE PRICING		DATE PREPARED					
PROJECT		EMCS FEASIBILITY STUDY		LOCATION						DACA41-92-C-0098		MARCH 1993		26-Mar-93							
BLDG. NO.		768		FT. LEONARD WOOD, MISSOURI						CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/>		DRAWING NO.		SHT OF							
SINGLE ZONE & VAV AHU		AHU-2		Quantity		LABOR		EQUIPMENT		MATERIAL		ESTIMATOR		CHECKED BY							
SYS. NO.	TASK DESCRIPTION	No. Of Units	Unit Meas	MH/ Unit	Total Hrs	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost	TOTAL	KC	SHIPPING	CEL						
Digital Output	Control Relay	1	EA	2	2.2	26	\$56			43	\$43	\$99									
	H/O/A & Control Relay		EA	3		26				77											
Analog Output	CPA (Damper)	1	EA	3	3.1	26	\$81			295	\$295	\$376									
	CPA (Valve)	2	EA	3	6.3	26	\$161			295	\$590	\$752									
Digital Input	Diff. Pressure Sw. (Fan)	1	EA	3	3.4	26	\$98			71	\$71	\$159									
	Diff. Pressure Sw. (Filter)	1	EA	3	3.4	26	\$88			71	\$71	\$159									
	End Position Switch		EA	2		26				69											
Analog Input	Temp. Space	2	EA	3	5.3	26	\$135			174	\$348	\$483									
	Temp. Avg. Duct	1	EA	4	3.6	26	\$93			190	\$190	\$283									
	Position	1	EA	3	3.1	26	\$81			191	\$191	\$271									
	Temp. Duct	2	EA	3	6.3	26	\$161			185	\$370	\$531									
TOTAL THIS SHEET																\$2,169	\$5,113				

COST ESTIMATE ANALYSIS

COST ESTIMATE ANALYSIS										INVITATION NO./CONTRACT NO.		EFFECTIVE PRICING		DATE PREPARED	
PROJECT		EMCS FEASIBILITY STUDY		LOCATION		FT. LEONARD WOOD, MISSOURI		BLDG. NO. 768		DACA41-92-C-0098		MARCH 1993		26-Mar-93	
SINGLE ZONE & VAV AHU		AHU-4		TASK DESCRIPTION		Control Relay		H/O/A & Control Relay		ESTIMATOR		KC		CHECKED BY CEL	
SYS. NO.		No. Of Units		Quantity		LABOR		EQUIPMENT		MATERIAL		TOTAL		SHIPPING	
		MH/ Unit		Meas		Total Hrs		Unit Price		Unit Price		Cost		Unit Wt	
		1 EA		EA		2 2.2		26		43		\$399			
		2 EA		EA		3 6.3		26		77					
Digital Output	CPA (Damper)	1	EA	3	3.1	26	\$81			295	\$295	\$376			
	CPA (Valve)	2	EA	3	6.3	26	\$161			295	\$590	\$752			
Digital Input	Diff. Pressure Sw. (Fan)	1	EA	3	3.4	26	\$88			71	\$71	\$159			
	Diff. Pressure Sw. (Filter)	1	EA	3	3.4	26	\$88			71	\$71	\$159			
	End Position Switch		EA	2		26				69					
Analog Input	Temp. Space	2	EA	3	5.3	26	\$135			174	\$348	\$483			
	Temp. Avg. Duct	1	EA	4	3.6	26	\$93			190	\$190	\$283			
	Position	1	EA	3	3.1	26	\$81			191	\$191	\$271			
	Temp. Duct	2	EA	3	6.3	26	\$161			185	\$370	\$531			
TOTAL THIS SHEET							\$944					\$2,169	\$3,113		

COST ESTIMATE ANALYSIS

[illegible]

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY										INVITATION NO./CONTRACT NO. DACA41-92-C-0098				EFFECTIVE PRICING MARCH 1993		DATE PREPARED 26-Mar-93	
LOCATION FT. LEONARD WOOD, MISSOURI										CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/>				DRAWING NO.		SHT OF	
BLDG. NO. 768										OTHER <input type="checkbox"/>				ESTIMATOR		CHECKED BY CEL	
AIR COOLED DX COMPRESSOR		LABOR		EQUIPMENT		MATERIAL		TOTAL		SHIPPING							
SYS. NO.	ACCU-2	No. Of Units	Unit Meas	MH/ Unit	Total Hrs	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost	Unit Wt	Total Wt				
Digital Output	Control Relay	1	EA	2	2.2	26	\$56			43	\$43		\$99				
Analog Output																	
Digital Input	Status Relay	1	EA	2	1.9	26	\$49			41	\$41		\$91				
Analog Input																	
TOTAL THIS SHEET							\$105				\$85		\$190				

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY										INVITATION NO./CONTRACT NO.				EFFECTIVE PRICING		DATE PREPARED	
LOCATION FT. LEONARD WOOD, MISSOURI										DACA41-92-C-0098				MARCH 1993		26-Mar-93	
BLDG. NO. 768										<input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER				DRAWING NO.		SHT OF	
AIR COOLED DX COMPRESSOR										ESTIMATOR		KC		CHECKED BY		CEL	
SYS. NO. ACCU-3										MATERIAL		TOTAL		SHIPPING			
TASK DESCRIPTION										Unit Price		Cost		Unit Wt		Total Wt	
Digital Output										43		\$43		\$99			
Analog Output																	
Digital Input										41		\$41		\$91			
Analog Input																	
TOTAL THIS SHEET												\$105		\$85		\$190	

COST ESTIMATE

BUILDING 802

COST ESTIMATE ANALYSIS

COST ESTIMATE ANALYSIS										INVITATION NO./CONTRACT NO.				EFFECTIVE PRICING		DATE PREPARED					
PROJECT EMCS FEASIBILITY STUDY										DACA41-92-C-0098				MARCH 1993		26-Mar-93					
LOCATION FT. LEONARD WOOD, MISSOURI										CODE A <input type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/>				DRAWING NO.		SHT OF					
BLDG. NO. 802										OTHER <input type="checkbox"/>											
AHU		SYS. NO.		ACU-1		Quantity		LABOR		EQUIPMENT		MATERIAL		ESTIMATOR		KC		CHECKED BY		CEL	
TASK DESCRIPTION		No. Of Units	Unit Meas	MH/ Unit	Total Hrs	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost	TOTAL		SHIPPING		Total		Wt	
Digital Output	Control Relay	1	EA	2	2.2	26	\$56					43	\$43		\$99						
Analog Output	CPA (Valve)	1	EA	3	3.1	26	\$81					295	\$295		\$376						
Digital Input	Diff. Pressure Sw. (Fan)	1	EA	3	3.4	26	\$88					71	\$71		\$159						
Analog Input	Temp. Space	2	EA	3	5.3	26	\$135					174	\$348		\$483						
TOTAL THIS SHEET																\$757					\$1,117

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COST ESTIMATE ANALYSIS

COST ESTIMATE ANALYSIS										INVITATION NO./CONTRACT NO.				EFFECTIVE PRICING		DATE PREPARED	
PROJECT EMCS FEASIBILITY STUDY										DACA41-92-C-0098				MARCH 1993		26-Mar-93	
LOCATION FT. LEONARD WOOD, MISSOURI										CODE A <input type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/>				DRAWING NO.		SHT OF	
BLDG. NO. 802										OTHER <input type="checkbox"/>				ESTIMATOR		CHECKED BY	
AHU		SYS. NO.		ACU-2		Quantity		LABOR		EQUIPMENT		MATERIAL		TOTAL		SHIPPING	
TASK DESCRIPTION		No. Of Units	Unit Meas	MH/ Unit	Total Hrs	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost	Unit	Wt	Unit	Total Wt
Digital Output	Control Relay	1	EA	2	2.2	26	\$56					43	\$43		\$99		
Analog Output	CPA (Valve)	1	EA	3	3.1	26	\$81					295	\$295		\$376		
Digital Input	Diff. Pressure Sw. (Fan)	1	EA	3	3.4	26	\$88					71	\$71		\$159		
Analog Input	Temp. Space	2	EA	3	5.3	26	\$135					174	\$348		\$483		
TOTAL THIS SHEET							\$360								\$757		\$1,117

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PAGE

COST ESTIMATE

**BUILDING 819
AND TYPICAL FOR
815 THRU 818, AND 827 THRU 831**

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY LOCATION FT. LEONARD WOOD, MISSOURI BLDG. NO. 819										INVITATION NO./CONTRACT NO. DACA41-92-C-0098 CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER <input type="checkbox"/>				EFFECTIVE PRICING MARCH 1993 DRAWING NO.		DATE PREPARED 26-Mar-93 SHT OF			
STEAM-HW CONVERTER SYS. NO. CV-1 TASK DESCRIPTION Digital Output Control Relay										LABOR No. Of Units 1 EA Meas Unit 2 MH/ Unit 2 Total Hrs 2.2		EQUIPMENT Unit Price 26 Cost \$56		MATERIAL Unit Price 43 Cost \$43		TOTAL \$99		CHECKED BY CEL SHIPPING Unit Wt	
Analog Output CPA (Electric)										1 EA 4 4.1 26		\$106		295 \$295		\$402			
Digital Input Pressure Switch (Elec)										1 EA 2 2.4 26		\$62		52 \$52		\$114			
Pressure Switch (Plum)										1 EA 2 1.9 24		\$47		51 \$51		\$97			
Analog Input Temp. Water (Elec)										1 EA 3 3.1 26		\$81		222 \$222		\$303			
Temp. Water (Plum)										1 EA 2 2.1 24		\$52		65 \$65		\$117			
TOTAL THIS SHEET												\$403		\$728		\$1,192		PAGE	

COST ESTIMATE ANALYSIS

INVITATION NO./CONTRACT NO.

EFFECTIVE PRICING

DATE PREPARED

DACA41-92-C-0098

MARCH 1993

26-Mar-93

PROJECT EMCS FEASIBILITY STUDY

PROJECT EMCS FEASIBILITY STUDY

PROJECT EMC

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CODE A	X
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CODE B

	CODE C
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DRAWING NO.

SHT OF

LOCATION	PL. LEON
BLDG. NO.	819
STEAM HW CONVERTER	

SYS. NO. CV-2

TASK DESCRIPTION

Digital Output	Control Relay
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Analog Output

CPA (Electric)

Digital Input

Pressure Switch (Elec)

Pressure Switch (Blum)

Analog Input

Temp. Water (Elec)

Temp Water (Plum)

TOTAL THIS SHEET

\$403

\$728

\$1.132

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PAGE

COST ESTIMATE

BUILDING 826

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY LOCATION FT. LEONARD WOOD, MISSOURI BLDG. NO. 826										INVITATION NO./CONTRACT NO. DACA41-92-C-0098 <input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER				EFFECTIVE PRICING MARCH 1993 DRAWING NO.		DATE PREPARED 26-Mar-93 SHT OF					
AHU SYS. NO. HV-1 TASK DESCRIPTION Control Relay										LABOR Total Hrs 2.2		EQUIPMENT Unit Price 26		MATERIAL Unit Price 43		ESTIMATOR Cost \$43		KC TOTAL \$99		CHECKED BY CEL SHIPPING Unit Wt	
Digital Output										1 EA		26		43		\$99					
Analog Output										1 EA		3.1		26		295		\$295		\$376	
Digital Input										1 EA		3.4		26		71		\$71		\$159	
Analog Input										2 EA		5.3		26		174		\$348		\$483	
TOTAL THIS SHEET																\$360		\$757		\$1,117	

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY LOCATION FT. LEONARD WOOD, MISSOURI BLDG. NO. 826										INVITATION NO./CONTRACT NO. DACA41-92-C-0098 <input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER				EFFECTIVE PRICING MARCH 1993 DRAWING NO.		DATE PREPARED 26-Mar-93 SHT OF	
AHU		Quantity No. Of Units		LABOR Mth/ Unit Total Hrs		EQUIPMENT Unit Price Cost		MATERIAL Unit Price Cost		ESTIMATOR KC		CHECKED BY CEL SHIPPING					
SYS. NO. HV-2		TASK DESCRIPTION		Unit Price		Unit Price		Unit Price		Unit Price		Unit Price					
Digital Output		1 EA		2 2.2		26		\$56		43		\$99					
Analog Output		1 EA		3 3.1		26		\$81		295		\$376					
Digital Input		1 EA		3 3.4		26		\$88		71		\$159					
Analog Input		2 EA		3 5.3		26		\$135		174		\$483					
Temp. Space																	
TOTAL THIS SHEET								\$360				\$757					
												\$1,117					

COST ESTIMATE ANALYSIS

PROJECT										INVITATION NO./CONTRACT NO.										EFFECTIVE PRICING		DATE PREPARED	
LOCATION										DAC441-92-C-0098										MARCH 1993		26-Mar-93	
BLDG. NO. 826										<input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER										DRAWING NO.		SHT OF	
AHU										ESTIMATOR										KC		CHECKED BY	
SYS. NO. HV-5										EQUIPMENT										TOTAL		SHIPPING	
TASK DESCRIPTION										Unit Price										Unit Price		Unit Wt	
Digital Output										1 EA 2 2.2 26 \$56										43		\$99	
Analog Output										1 EA 3 3.1 26 \$81										295		\$376	
Digital Input										1 EA 3 3.4 26 \$88										71		\$159	
Analog Input										2 EA 3 5.3 26 \$135										174		\$483	
TOTAL THIS SHEET										\$360												\$1,117	

COST ESTIMATE

BUILDING 837

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY LOCATION FT. LEONARD WOOD, MISSOURI BLDG. NO. 837										INVITATION NO./CONTRACT NO. DACA41-92-C-0098 CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER <input type="checkbox"/>				EFFECTIVE PRICING MARCH 1993 DRAWING NO.		DATE PREPARED 02-Apr-93 SHT OF			
STEAM HW CONVERTER SYS. NO. CV-1 TASK DESCRIPTION Digital Output Control Relay										LABOR MH/ Unit Total Hrs 2 2.2 26		EQUIPMENT Unit Price Cost		MATERIAL Unit Price Cost		ESTIMATOR KC TOTAL \$295 \$402		CHECKED BY CEL SHIPPING Unit Wt	
Analog Output CPA (Electric)										1 EA 4 4.1 26		\$106		295		\$295 \$402			
Digital Input Pressure Switch (Elec)										1 EA 2 2.4 26		\$62		52		\$52 \$114			
Pressure Switch (Plum)										1 EA 2 1.9 24		\$47		51		\$51 \$97			
Analog Input Temp. Water (Elec)										1 EA 3 3.1 26		\$81		222		\$222 \$303			
Temp. Water (Plum)										1 EA 2 2.1 24		\$52		65		\$65 \$117			
TOTAL THIS SHEET												\$403				\$728 \$1,132			

COST ESTIMATE

BUILDING 844

COST ESTIMATE ANALYSIS

COST ESTIMATE ANALYSIS										INVITATION NO./CONTRACT NO.				EFFECTIVE PRICING		DATE PREPARED	
PROJECT EMCS FEASIBILITY STUDY										DACA41-92-C-0098				MARCH 1993		26-Mar-93	
LOCATION FT. LEONARD WOOD, MISSOURI										CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/>				DRAWING NO.		SHT OF	
BLDG. NO. 844										OTHER <input type="checkbox"/>							
PERIMETER RADIATION										ESTIMATOR				KC		CHECKED BY C.E.L.	
SYS. NO. RAD-1										MATERIAL				TOTAL		SHIPPING	
TASK DESCRIPTION										Unit Price				Cost		Unit Wt	
Digital Output																	
Analog Output																	
Digital Input																	
Analog Input																	
TOTAL THIS SHEET																	
Digital Output																	
Analog Output																	
Digital Input																	
Analog Input																	
TOTAL THIS SHEET																	

COST ESTIMATE ANALYSIS

PROJECT										INVESTMENT NO./CONTRACT NO.										EFFECTIVE PRICING		DATE PREPARED	
LOCATION										DACA41-92-C-0098										MARCH 1993		26-Mar-93	
BLDG. NO. 844										CODE A <input type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/>										DRAWING NO.		SHT OF	
AIR COOLED CHILLER										ESTIMATOR										KC		CHECKED BY	
SYS. NO. CH-1										MATERIAL										TOTAL		SHIPPING	
TASK DESCRIPTION										Unit Price										Cost		Unit Wt	
Digital Output										43										\$99			
Analog Output																							
Digital Input										52										\$114			
Analog Input										65										\$234			
Pressure Switch (Elec)										26										\$62			
Pressure Switch (Plum)										24										\$47			
Status Relay										26										\$98			
Temp. Water (Elec)										26										\$161			
Temp. Water (Plum)										24										\$104			
TOTAL THIS SHEET																				\$528			
																				\$803		\$1,391	

COST ESTIMATE ANALYSIS

COST ESTIMATE ANALYSIS														INVITATION NO./CONTRACT NO.				EFFECTIVE PRICING		DATE PREPARED	
PROJECT				EMCS FEASIBILITY STUDY				DACA41-92-C-0098				MARCH 1993		26-Mar-93							
LOCATION				FT. LEONARD WOOD, MISSOURI				CODE A <input type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/>				DRAWING NO.		SHT OF							
BLDG. NO.				844				OTHER <input type="checkbox"/>				ESTIMATOR		CHECKED BY							
ELECTRIC DW HEATER				LABOR				EQUIPMENT				MATERIAL		TOTAL							
SYS. NO.				DHW-1				Unit Price				Unit Price		Unit Price							
TASK DESCRIPTION				Meas Unit				Cost				Cost		Cost							
Digital Output				1 EA				\$75				77		\$152							
Analog Output																					
Digital Input				1 EA				\$49				41		\$91							
Analog Input																					
TOTAL THIS SHEET								\$124						\$242							

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PAGE

COST ESTIMATE

**BUILDING 1012
1013 THRU 1016, 1028, AND 1029**

COST ESTIMATE ANALYSIS

[illegible]

COST ESTIMATE ANALYSIS

[illegible]

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY										INVITATION NO./CONTRACT NO.										EFFECTIVE PRICING		DATE PREPARED			
LOCATION FT. LEONARD WOOD, MISSOURI										DACA41-92-C-0098										MARCH 1993		26-Mar-93			
BLDG. NO. 1012										CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/>										DRAWING NO.		SHT OF			
										OTHER <input type="checkbox"/>										ESTIMATOR		CHECKED BY			
FAN COIL										LABOR										MATERIAL		SHIPPING			
SYS. NO. FC-3										Total Hrs 2.2 2.2 26										Unit Price 43		Total Wt			
TASK DESCRIPTION										Unit Price										Cost		Unit Wt			
Digital Output										1 EA										\$56		\$43		\$99	
Analog Output										1 EA										\$93		\$415		\$508	
Digital Input																									
Analog Input										1 EA										\$68		\$50		\$117	
Temp. Space (RTD Only)																									
TOTAL THIS SHEET																				\$217		\$508		\$725	

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY LOCATION FT. LEONARD WOOD, MISSOURI BLDG. NO. 1012										INVITATION NO./CONTRACT NO. DACA41-92-C-0098 <input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER				EFFECTIVE PRICING MARCH 1993 DRAWING NO.		DATE PREPARED 26-Mar-93 SHT OF	
STEAM-HW CONVERTER SYS. NO. CV-2										ESTIMATOR		KC		CHECKED BY CEL			
TASK DESCRIPTION		Quantity		LABOR		EQUIPMENT		MATERIAL		TOTAL		SHIPPING					
No. Of Units	Unit Meas	MH/ Unit	Total Hrs	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost	Unit	Wt	Unit	Total Wt				
1	EA	2	2.2	26	\$56			43	\$43								
Digital Output																	
1	EA	4	4.1	26	\$106			295	\$295								
Analog Output																	
1	EA	2	2.4	26	\$62			52	\$52								
Pressure Switch (Elec)																	
1	EA	2	1.9	24	\$47			51	\$51								
Pressure Switch (Plum)																	
Analog Input																	
1	EA	3	3.1	26	\$81			222	\$222								
Temp. Water (Elec)																	
1	EA	2	2.1	24	\$52			65	\$65								
Temp. Water (Plum)																	
TOTAL THIS SHEET																	
										\$403		\$728	\$1,132				

COST ESTIMATE

BUILDING 1025

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY LOCATION FT. LEONARD WOOD, MISSOURI BLDG. NO. 1025										INVITATION NO./CONTRACT NO. DACA41-92-C-0098				EFFECTIVE PRICING MARCH 1993 DRAWING NO.		DATE PREPARED 26-Mar-93 SHT OF			
BLDG. NO. 1025 AHU										<input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER		ESTIMATOR		KC		CHECKED BY		CEL	
SYS. NO.		AHU-1		LABOR		QUANTITY		EQUIPMENT		MATERIAL		TOTAL		SHIPPING					
TASK DESCRIPTION		No. Of Units	Unit Meas	MH/ Unit	Total Hrs	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost	Unit Price	Total Wt				
Digital Output	Control Relay	1	EA	2	2.2	26	\$56					43	\$43	\$99					
Analog Output	CPA (Valve)	1	EA	3	3.1	26	\$81			295	\$295			\$376					
Digital Input	Diff. Pressure Sw. (Fan)	1	EA	3	3.4	26	\$88			71	\$71			\$159					
Analog Input	Temp. Space	2	EA	3	5.3	26	\$135			174	\$348			\$483					
TOTAL THIS SHEET							\$360						\$757	\$1,117					

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY										INVITATION NO./CONTRACT NO. DACA41-92-C-0098										EFFECTIVE PRICING MARCH 1993		DATE PREPARED 26-Mar-93																																	
LOCATION FT. LEONARD WOOD, MISSOURI										CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/>										DRAWING NO.		SHT OF																																	
BLDG. NO. 1025										OTHER <input type="checkbox"/>																																													
PERIMETER RADIATION										LABOR										EQUIPMENT										MATERIAL										ESTIMATOR		KC		CHECKED BY		CEL									
SYS. NO. RAD-1										MH/ Unit										Unit Price										Unit Price										Unit		Wt		Total		Wt									
TASK DESCRIPTION										Total Hrs										Cost										Cost										Cost		Cost		Total		Total									
Digital Output																																																							
Analog Output										1 EA										3 3.1										26										\$81										295		\$295		\$376	
ACU (Fan Coil)										1 EA										4 3.6										26										\$93										415		\$415		\$508	
Digital Input																																																							
Analog Input										2 EA										3 5.3										26										\$135										174		\$348		\$483	
Temp. Space																																																							
TOTAL THIS SHEET																																								\$309								\$1,058		\$1,367					

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY										INVITATION NO./CONTRACT NO.				EFFECTIVE PRICING		DATE PREPARED	
LOCATION FT. LEONARD WOOD, MISSOURI										DACA41-92-C-0098				MARCH 1993		26-Mar-93	
BLDG. NO. 1025										<input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER				DRAWING NO.		SHT OF	
STEAM HW CONVERTER										ESTIMATOR				KC		CHECKED BY CEL	
SYS. NO. CV-1										MATERIAL				TOTAL		SHIPPING	
TASK DESCRIPTION										EQUIPMENT				MATERIAL		Total	
Digital Output										Unit Price				Cost		Unit Wt	
Control Relay										43				\$99			
Analog Output										295				\$402			
Digital Input										52				\$114			
Pressure Switch (Elec)										51				\$97			
Pressure Switch (Plum)																	
Analog Input										222				\$303			
Temp. Water (Elec)										65				\$117			
Temp. Water (Plum)																	
TOTAL THIS SHEET										\$403				\$728		\$1,192	

COST ESTIMATE

BUILDING 1350

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY										INVITATION NO./CONTRACT NO. DACA41-92-C-0098				EFFECTIVE PRICING MARCH 1993		DATE PREPARED 26-Mar-93	
LOCATION FT. LEONARD WOOD, MISSOURI										CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/>				DRAWING NO.		SHT OF	
BLDG. NO. 1350										OTHER <input type="checkbox"/>				ESTIMATOR		KC	
AHU										LABOR				MATERIAL		CHECKED BY CEL	
SYS. NO. AHU-4										MH/ Unit				Unit Price		SHIPPING	
TASK DESCRIPTION										Total Hrs				Cost		Unit Wt	
Digital Output										1 EA 2 2.2 26				\$56		43 \$99	
Analog Output										1 EA 3 3.1 26				\$81		295 \$295 \$376	
Digital Input										1 EA 3 3.4 26				\$88		71 \$71 \$159	
Analog Input										2 EA 3 5.3 26				\$135		174 \$348 \$483	
Temp. Space																	
TOTAL THIS SHEET														\$360		\$757 \$1,117	

COST ESTIMATE ANALYSIS

PROJECT										INVESTMENT NO./CONTRACT NO.										EFFECTIVE PRICING		DATE PREPARED	
EMCS FEASIBILITY STUDY										DACA41-92-C-0098										MARCH 1993		26-Mar-93	
LOCATION FT. LEONARD WOOD, MISSOURI										CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/>										DRAWING NO.		SHT OF	
BLDG. NO. 1350										OTHER <input type="checkbox"/>										ESTIMATOR		CHECKED BY	
SINGLE ZONE & VAV AHU										LABOR										MATERIAL		SHIPPING	
SYS. NO. AHU-5										Unit Price										Unit Price		Unit Price	
TASK DESCRIPTION										Total Hrs										Unit Price		Unit Price	
Digital Output										1 EA										26		43	
Control Relay										EA										26		77	
Analog Output										1 EA										26		295	
CPA (Damper)										2 EA										26		295	
CPA (Valve)																							
Digital Input										1 EA										26		71	
Diff. Pressure Sw. (Fan)										3										3.4		71	
Diff. Pressure Sw. (Filter)										3										3.4		71	
End Position Switch										2										26		69	
Analog Input										2 EA										26		174	
Temp. Space										3										5.3		348	
Temp. Avg. Duct										4										3.6		190	
Position										3										3.1		191	
Temp. Duct										3										6.3		185	
TOTAL THIS SHEET																						\$944	
																						\$2,169	
																						\$3,113	

COST ESTIMATE ANALYSIS

PROJECT										INVITATION NO./CONTRACT NO.				EFFECTIVE PRICING		DATE PREPARED				
EMCS FEASIBILITY STUDY										DACA41-92-C-0098				MARCH 1993		26-Mar-93				
LOCATION FT. LEONARD WOOD, MISSOURI										CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/>				DRAWING NO.		SHT OF				
BLDG. NO. 1350										OTHER <input type="checkbox"/>				ESTIMATOR		CHECKED BY				
HOT WATER BOILER										LABOR				MATERIAL				TOTAL		
SYS. NO. BLR-1										MH/ Unit				Unit Price				Unit Wt		
TASK DESCRIPTION										Total Hrs				Cost				Total Wt		
Digital Output										1	EA	2	2.2	26	\$56			43	\$99	
Analog Output										1	EA	4	4.1	26	\$106		295	\$402		
Digital Input																				
Pressure Switch (Elec)												2		26			52			
Pressure Switch (Plum)										1	EA	2	1.9	24	\$47		51	\$97		
Auxiliary Contact										1	EA	2	1.9	26	\$49		43	\$92		
Status Relay										1	EA	2	1.9	26	\$49		41	\$91		
Temp. Water (Elec)										2	EA	3	6.3	26	\$161		222	\$605		
Temp. Water (Plum)										2	EA	2	4.3	24	\$104		65	\$234		
TOTAL THIS SHEET															\$572			\$1,048	\$1,620	

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY										INVITATION NO./CONTRACT NO.				EFFECTIVE PRICING		DATE PREPARED	
LOCATION FT. LEONARD WOOD, MISSOURI										DACA41-92-C-0098				MARCH 1993		26-Mar-93	
BLDG. NO. 1350										<input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER				DRAWING NO.		SHT OF	
AIR COOLED DX COMPRESSOR										EQUIPMENT				ESTIMATOR		CHECKED BY	
SYS. NO. ACCU-3										LABOR				MATERIAL		SHIPPING	
TASK DESCRIPTION										No. Of Units Meas Unit Total Hrs Unit Price Cost				Unit Price Cost Total		Unit Wt Total Wt	
Digital Output										1 EA 2 2.2 26 \$56				43 \$43 \$99			
Analog Output																	
Digital Input										1 EA 2 1.9 26 \$49				41 \$41 \$91			
Analog Input																	
TOTAL THIS SHEET										\$105				\$85		\$190	

COST ESTIMATE ANALYSIS

[illegible]

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY										INVITATION NO./CONTRACT NO. DACA41-92-C-0098										EFFECTIVE PRICING MARCH 1993				DATE PREPARED 26-Mar-93																																	
LOCATION FT. LEONARD WOOD, MISSOURI										<input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER										DRAWING NO.				SHT OF																																	
BLDG. NO. 1350																				ESTIMATOR				CHECKED BY																																	
ELECTRIC DW HEATER										LABOR										MATERIAL										TOTAL				SHIPPING																							
SYS. NO. DHW-1										Quantity No. Of Units MH/ Unit Total Hrs										Unit Price Cost Unit Price Cost										Unit Price Cost Unit Price Cost				Unit Price Cost Unit Price Cost																							
TASK DESCRIPTION										H/O/A & Control Relay																																															
Digital Output										1 EA										3 2.9 26										\$75										77										\$152							
Analog Output																																																									
Digital Input										1 EA										2 1.9 26										\$49										41										\$91							
Analog Input																																																									
TOTAL THIS SHEET																				\$124																				\$118				\$242													

COST ESTIMATE

BUILDING 1382

COST ESTIMATE ANALYSIS

COST ESTIMATE ANALYSIS										INVITATION NO./CONTRACT NO.				EFFECTIVE PRICING		DATE PREPARED	
PROJECT		EMCS FEASIBILITY STUDY				DACA41-92-C-0098				MARCH 1993		29-Mar-93					
LOCATION		FT. LEONARD WOOD, MISSOURI				CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/>				DRAWING NO.		SHT OF					
BLDG. NO.		1382				OTHER <input type="checkbox"/>											
HOT WATER BOILER		Quantity		LABOR		EQUIPMENT		MATERIAL		ESTIMATOR		CHECKED BY					
SYS. NO.		BLR-1		Total		Unit		Unit		TOTAL		SHIPPING					
TASK DESCRIPTION		Meas		Hrs		Price		Price		Cost		Unit					
Digital Output		1 EA		2.2		26		43		\$99		Wt					
Analog Output		1 EA		4.1		26		295		\$402							
Digital Input		1 EA		2		26		51		\$97							
Pressure Switch (Elec)		1 EA		1.9		24		43		\$92							
Pressure Switch (Plum)		1 EA		1.9		26		41		\$91							
Auxiliary Contact		1 EA		2		26											
Status Relay		1 EA		1.9		26											
Temp. Water (Elec)		2 EA		6.3		26		222		\$805							
Temp. Water (Plum)		2 EA		4.3		24		65		\$234							
TOTAL THIS SHEET										\$1,048		\$1,620					

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY LOCATION FT. LEONARD WOOD, MISSOURI BLDG. NO. 1382										INVITATION NO./CONTRACT NO. DACA41-92-C-0098 CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER <input type="checkbox"/>				EFFECTIVE PRICING MARCH 1993 DRAWING NO.		DATE PREPARED 29-Mar-93 SHT OF									
HOT WATER BOILER SYS. NO. BLR-2 TASK DESCRIPTION Digital Output Control Relay										LABOR Unit Price 26		EQUIPMENT Unit Price 43		MATERIAL Unit Price 43		ESTIMATOR Cost \$43		KC Total \$99		CHECKED BY CEL SHIPPING Unit Wt					
Analog Output										4.1		4		26		\$106		295		\$295		\$402			
Digital Input										2		2		26		52		51		\$97		43		\$92	
Pressure Switch (Elec)										2		2		26		51		51		\$97		43		\$92	
Pressure Switch (Plum)										2		2		26		43		43		\$92		41		\$91	
Auxiliary Contact										2		2		26		43		43		\$92		41		\$91	
Status Relay										2		2		26		43		43		\$92		41		\$91	
Temp. Water (Elec)										3		3		26		222		222		\$605		65		\$234	
Temp. Water (Plum)										2		2		24		65		65		\$234		65		\$234	
TOTAL THIS SHEET										\$572		\$1,048		\$1,620		\$1,620		\$1,620		\$1,620		\$1,620			

COST ESTIMATE

BUILDING 1383

COST ESTIMATE ANALYSIS

[illegible]

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY LOCATION FT. LEONARD WOOD, MISSOURI BLDG. NO. 1383										INVITATION NO./CONTRACT NO. DACA41-92-C-0098 <input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER				EFFECTIVE PRICING MARCH 1993 DRAWING NO.		DATE PREPARED 26-Mar-93 SHT OF	
UNIT HEATER SYS. NO. UH-5 TASK DESCRIPTION Control Relay										ESTIMATOR		KC TOTAL		CHECKED BY CEL			
Quantity No. Of Units 1 EA										LABOR MH/ Unit 2 Total Hrs 2.2		EQUIPMENT Unit Price 26		MATERIAL Unit Price 43		SHIPPING Unit Wt \$56	
Digital Output										1 EA		2		26		\$56	
Analog Output																	
Digital Input										1 EA		2		1.9		\$49	
Auxiliary Contact																\$92	
Analog Input										1 EA		3		2.6		\$68	
Temp. Space																\$242	
TOTAL THIS SHEET																\$433	

COST ESTIMATE

BUILDING 1390

COST ESTIMATE ANALYSIS

COST ESTIMATE ANALYSIS														INVITATION NO./CONTRACT NO. DACA41-92-C-0098				EFFECTIVE PRICING MARCH 1993		DATE PREPARED 27-Mar-93	
PROJECT EMCS FEASIBILITY STUDY				LOCATION FT. LEONARD WOOD, MISSOURI										DRAWING NO.		SHT OF					
BLDG. NO. 1390				AHU										ESTIMATOR		CHECKED BY					
SYS. NO. hv-1				LABOR				EQUIPMENT		MATERIAL		TOTAL		SHIPPING							
TASK DESCRIPTION		Quantity		MH/		Total		Unit		Unit		Unit		Unit							
		No. Of	Unit	Units	Meas	Unit	Hrs	Price	Cost	Unit	Price	Cost	Unit	Price	Cost						
Digital Output	Control Relay	1	EA	2	2.2	26		\$56					43		\$99						
Analog Output	CPA (Valve)	1	EA	3	3.1	26		\$81					295		\$376						
Digital Input	Diff. Pressure Sw. (Fan)	1	EA	3	3.4	26		\$88					71		\$159						
Analog Input	Temp. Space	2	EA	3	5.3	26		\$135					174		\$483						
TOTAL THIS SHEET																\$757	\$1,117				

DA FORM 5418-R, APR 85

PAGE

COST ESTIMATE ANALYSIS

COST ESTIMATE ANALYSIS														INVITATION NO./CONTRACT NO.				EFFECTIVE PRICING		DATE PREPARED	
PROJECT		EMCS FEASIBILITY STUDY		DACA41-92-C-0098										MARCH 1993		27-Mar-93					
LOCATION		FT. LEONARD WOOD, MISSOURI		CODE A		CODE B		CODE C		DRAWING NO.		SHT		OF							
BLDG. NO.		1390		OTHER		ESTIMATOR		KC		CHECKED BY		CEL		SHIPPING							
AHU		SYS. NO.		HV-3		LABOR		EQUIPMENT		MATERIAL		TOTAL		Total							
TASK DESCRIPTION		No. Of Units		MH/ Unit		Total Hrs		Unit Price		Cost		Unit Price		Cost		Unit Wt					
Digital Output	Control Relay	1	EA	2	2.2	26	\$58				43	\$43	\$99								
Analog Output	CPA (Valve)	1	EA	3	3.1	26	\$81				295	\$295	\$376								
Digital Input	Diff. Pressure Sw. (Fan)	1	EA	3	3.4	26	\$88				71	\$71	\$159								
Analog Input	Temp. Space	2	EA	3	5.3	26	\$135				174	\$348	\$483								
TOTAL THIS SHEET							\$360					\$757	\$1,117								

DA FORM 5418-R, APR 95

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY LOCATION FT. LEONARD WOOD, MISSOURI BLDG. NO. 1390										INVITATION NO./CONTRACT NO. DACA41-92-C-0098 CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER <input type="checkbox"/>				EFFECTIVE PRICING MARCH 1993 DRAWING NO.		DATE PREPARED 27-Mar-93 SHT OF	
PERIMETER RADIATION SYS. NO. RAD-1 TASK DESCRIPTION										ESTIMATOR		KC		CHECKED BY CEL			
TASK DESCRIPTION		Quantity		LABOR		EQUIPMENT		MATERIAL		TOTAL		SHIPPING					
		No. Of Units	Unit Meas	MH/ Unit	Total Hrs	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost	Unit Wt	Total Wt				
Digital Output																	
Analog Output		1	EA	3	3.1		\$81			295	\$295		\$376				
ACU (Fan Coil)		1	EA	4	3.6		\$93			415	\$415		\$508				
Digital Input																	
Analog Input		2	EA	3	5.3		\$135			174	\$348		\$483				
Temp. Space																	
TOTAL THIS SHEET							\$309				\$1,058		\$1,367				

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY										INVITATION NO./CONTRACT NO.										EFFECTIVE PRICING		DATE PREPARED	
LOCATION FT. LEONARD WOOD, MISSOURI										DACA41-92-C-0098										MARCH 1993		27-Mar-93	
BLDG. NO. 1390										<input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER										DRAWING NO.		SHT OF	
HOT WATER BOILER										LABOR										ESTIMATOR		CHECKED BY	
SYS. NO. BLR-1										MATERIAL										TOTAL		SHIPPING	
TASK DESCRIPTION										Unit Price										Cost		Unit Wt	
Digital Output										43										\$43		\$99	
Analog Output										295										\$295		\$402	
Digital Input										52													
Pressure Switch (Elec)										51										\$51		\$97	
Pressure Switch (Plum)										43										\$43		\$92	
Auxiliary Contact										41										\$41		\$91	
Status Relay																							
Analog Input										222										\$444		\$605	
Temp. Water (Elec)										65										\$130		\$234	
Temp. Water (Plum)																							
TOTAL THIS SHEET										\$572										\$1,048		\$1,620	

COST ESTIMATE

BUILDING 1391

COST ESTIMATE

BUILDING 1601

COST ESTIMATE

BUILDING 1700

COST ESTIMATE ANALYSIS

[illegible]

COST ESTIMATE

**BUILDING 1702
AND TYPICAL FOR
1701, 1706, AND 1707**

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY LOCATION FT. LEONARD WOOD, MISSOURI BLDG. NO. 1702										INVITATION NO./CONTRACT NO. DACA41-92-C-0098 <input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER				EFFECTIVE PRICING MARCH 1993 DRAWING NO.		DATE PREPARED 16-Mar-93 SHT OF							
FAN COIL SYS. NO. FC-1 TASK DESCRIPTION Control Relay										LABOR MH/ Unit Total Hrs 2.2		EQUIPMENT Unit Price Cost		MATERIAL Unit Price Cost		ESTIMATOR KC TOTAL \$43 \$99		CHECKED BY CEL SHIPPING Unit Wt					
Digital Output										1 EA		26		\$56		43		\$99					
Analog Output										1 EA		3.6		4		26		\$93		415		\$508	
Digital Input																							
Analog Input										1 EA		2.6		3		26		\$68		50		\$117	
TOTAL THIS SHEET																\$217				\$508 \$725			

COST ESTIMATE ANALYSIS

INVITATION NO./CONTRACT NO.

EFFECTIVE PRICING

DATE PREPARED

DACA41-92-C-0098

MARCH 1993

16-Mar-93

PROJECT EMCS FEASIBILITY STUDY

LOCATION FT. LEONARD WOOD, MISSOURI

BLDG. NO. 1702

CODE A	X	CODE B	CODE C
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OTHER

DRAWING NO.

SHT	OF
1	1
2	2
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93	93
94	94
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97	97
98	98
99	99
100	100

BLDG

SYS. NO. HV-1

TASK DESCRIPTION

Digital Output	Control Relay
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COST ESTIMATE ANALYSIS

COST ESTIMATE ANALYSIS										INVITATION NO./CONTRACT NO. DACA41-92-C-0098				EFFECTIVE PRICING MARCH 1993		DATE PREPARED 16-Mar-93							
PROJECT EMCS FEASIBILITY STUDY		LOCATION FT. LEONARD WOOD, MISSOURI		BLDG. NO. 1702		AHU		SYS. NO. HV-2		TASK DESCRIPTION Control Relay		Quantity No. Of Units		LABOR MH/ Unit		EQUIPMENT Unit Price		MATERIAL Unit Price		ESTIMATOR TOTAL		CHECKED BY CEEL	
BDG. NO.		SYS. NO.		TASK DESCRIPTION		Quantity		LABOR		EQUIPMENT		MATERIAL		ESTIMATOR		TOTAL		CHECKED BY		SHIPPING			
BDG. NO.		SYS. NO.		TASK DESCRIPTION		Quantity		LABOR		EQUIPMENT		MATERIAL		ESTIMATOR		TOTAL		CHECKED BY		SHIPPING			
BDG. NO.		SYS. NO.		TASK DESCRIPTION		Quantity		LABOR		EQUIPMENT		MATERIAL		ESTIMATOR		TOTAL		CHECKED BY		SHIPPING			
BDG. NO.		SYS. NO.		TASK DESCRIPTION		Quantity		LABOR		EQUIPMENT		MATERIAL		ESTIMATOR		TOTAL		CHECKED BY		SHIPPING			
BDG. NO.		SYS. NO.		TASK DESCRIPTION		Quantity		LABOR		EQUIPMENT		MATERIAL		ESTIMATOR		TOTAL		CHECKED BY		SHIPPING			
BDG. NO.		SYS. NO.		TASK DESCRIPTION		Quantity		LABOR		EQUIPMENT		MATERIAL		ESTIMATOR		TOTAL		CHECKED BY		SHIPPING			
BDG. NO.		SYS. NO.		TASK DESCRIPTION		Quantity		LABOR		EQUIPMENT		MATERIAL		ESTIMATOR		TOTAL		CHECKED BY		SHIPPING			
BDG. NO.		SYS. NO.		TASK DESCRIPTION		Quantity		LABOR		EQUIPMENT		MATERIAL		ESTIMATOR		TOTAL		CHECKED BY		SHIPPING			
BDG. NO.		SYS. NO.		TASK DESCRIPTION		Quantity		LABOR		EQUIPMENT		MATERIAL		ESTIMATOR		TOTAL		CHECKED BY		SHIPPING			
BDG. NO.		SYS. NO.		TASK DESCRIPTION		Quantity		LABOR		EQUIPMENT		MATERIAL		ESTIMATOR		TOTAL		CHECKED BY		SHIPPING			
BDG. NO.		SYS. NO.		TASK DESCRIPTION		Quantity		LABOR		EQUIPMENT		MATERIAL		ESTIMATOR		TOTAL		CHECKED BY		SHIPPING			
BDG. NO.		SYS. NO.		TASK DESCRIPTION		Quantity		LABOR		EQUIPMENT		MATERIAL		ESTIMATOR		TOTAL		CHECKED BY		SHIPPING			
BDG. NO.		SYS. NO.		TASK DESCRIPTION		Quantity		LABOR		EQUIPMENT		MATERIAL		ESTIMATOR		TOTAL		CHECKED BY		SHIPPING			
BDG. NO.		SYS. NO.		TASK DESCRIPTION		Quantity		LABOR		EQUIPMENT		MATERIAL		ESTIMATOR		TOTAL		CHECKED BY		SHIPPING			
BDG. NO.		SYS. NO.		TASK DESCRIPTION		Quantity		LABOR		EQUIPMENT		MATERIAL		ESTIMATOR		TOTAL		CHECKED BY		SHIPPING			
BDG. NO.		SYS. NO.		TASK DESCRIPTION		Quantity		LABOR		EQUIPMENT		MATERIAL		ESTIMATOR		TOTAL		CHECKED BY		SHIPPING			
BDG. NO.		SYS. NO.		TASK DESCRIPTION		Quantity		LABOR		EQUIPMENT		MATERIAL		ESTIMATOR		TOTAL		CHECKED BY		SHIPPING			
BDG. NO.		SYS. NO.		TASK DESCRIPTION		Quantity		LABOR		EQUIPMENT		MATERIAL		ESTIMATOR		TOTAL		CHECKED BY		SHIPPING			
BDG. NO.		SYS. NO.		TASK DESCRIPTION		Quantity		LABOR		EQUIPMENT		MATERIAL		ESTIMATOR		TOTAL		CHECKED BY		SHIPPING			
BDG. NO.		SYS. NO.		TASK DESCRIPTION		Quantity		LABOR		EQUIPMENT		MATERIAL		ESTIMATOR		TOTAL		CHECKED BY		SHIPPING			
BDG. NO.		SYS. NO.		TASK DESCRIPTION		Quantity		LABOR		EQUIPMENT		MATERIAL		ESTIMATOR		TOTAL		CHECKED BY		SHIPPING			
BDG. NO.		SYS. NO.		TASK DESCRIPTION		Quantity		LABOR		EQUIPMENT		MATERIAL		ESTIMATOR		TOTAL		CHECKED BY		SHIPPING			
BDG. NO.		SYS. NO.		TASK DESCRIPTION		Quantity		LABOR		EQUIPMENT		MATERIAL		ESTIMATOR		TOTAL		CHECKED BY		SHIPPING			
BDG. NO.		SYS. NO.		TASK DESCRIPTION		Quantity		LABOR		EQUIPMENT		MATERIAL		ESTIMATOR		TOTAL		CHECKED BY		SHIPPING			
BDG. NO.		SYS. NO.		TASK DESCRIPTION		Quantity		LABOR		EQUIPMENT		MATERIAL		ESTIMATOR		TOTAL		CHECKED BY		SHIPPING			
BDG. NO.		SYS. NO.		TASK DESCRIPTION		Quantity		LABOR		EQUIPMENT		MATERIAL		ESTIMATOR		TOTAL		CHECKED BY		SHIPPING			
BDG. NO.		SYS. NO.		TASK DESCRIPTION		Quantity		LABOR		EQUIPMENT		MATERIAL		ESTIMATOR		TOTAL		CHECKED BY		SHIPPING			
BDG. NO.		SYS. NO.		TASK DESCRIPTION		Quantity		LABOR		EQUIPMENT		MATERIAL		ESTIMATOR		TOTAL		CHECKED BY		SHIPPING			
BDG. NO.		SYS. NO.		TASK DESCRIPTION		Quantity		LABOR		EQUIPMENT		MATERIAL											

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY										INVITATION NO./CONTRACT NO.										EFFECTIVE PRICING		DATE PREPARED			
LOCATION FT. LEONARD WOOD, MISSOURI										DACA41-92-C-0098										MARCH 1993		16-Mar-93			
BLDG. NO. 1702										<input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER										DRAWING NO.		SHT OF			
AHU										LABOR										ESTIMATOR		CHECKED BY			
SYS. NO. HV-3										MATERIAL										TOTAL		SHIPPING			
TASK DESCRIPTION										Unit Price										Cost		Unit Wt			
Digital Output										Control Relay										43		\$99			
Analog Output																									
Digital Input										Diff. Pressure Sw. (Fan)										71		\$159			
Analog Input										Temp. Space										174		\$483			
TOTAL THIS SHEET																				\$462		\$741			

COST ESTIMATE ANALYSIS

[illegible]

COST ESTIMATE ANALYSIS

COST ESTIMATE ANALYSIS										INVITATION NO./CONTRACT NO. DACA41-92-C-0098 CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER _____						EFFECTIVE PRICING MARCH 1993 DRAWING NO.		DATE PREPARED 16-Mar-93 SHT OF						
PROJECT EMCS FEASIBILITY STUDY		LOCATION FT. LEONARD WOOD, MISSOURI		BLDG. NO. 1702		STEAM HW CONVERTER		SYS. NO. CV - 1		TASK DESCRIPTION		Quantity		LABOR		EQUIPMENT		MATERIAL		ESTIMATOR		KC	CHECKED BY CEL	
No. Of Units	Unit Meas	MH/ Unit	Total Hrs	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost			Unit	Wt	Total Wt				
1	EA	2	2.2	26	\$56							43	\$43		\$99									
1	EA	4	4.1	26	\$106							295	\$295		\$402									
1	EA	2	2.4	26	\$62							52	\$52		\$114									
1	EA	2	1.9	24	\$47							51	\$51		\$97									
1	EA	3	3.1	26	\$81							222	\$222		\$303									
1	EA	2	2.1	24	\$52							65	\$65		\$117									
										\$403														
TOTAL THIS SHEET																								

PAGE
\$1,132

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COST ESTIMATE
BUILDING 1703 AND 1704

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY LOCATION FT. LEONARD WOOD, MISSOURI BLDG. NO. 1703										INVITATION NO./CONTRACT NO. DACA41-92-C-0098 CODE A <input type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER <input type="checkbox"/>										EFFECTIVE PRICING MARCH 1993 DRAWING NO.		DATE PREPARED 27 - Mar - 93 SHT OF	
FAN COIL SYS. NO. FC-1 TASK DESCRIPTION Control Relay										Quantity No. Of Units Unit Meas 1 EA		LABOR MH/ Unit Total Hrs 2 2.2		EQUIPMENT Unit Price Cost \$56		MATERIAL Unit Price Cost 43 \$43		ESTIMATOR KC TOTAL \$99		CHECKED BY CEL SHIPPING Unit Wt Unit Wt			
Digital Output																							
Analog Output										1 EA 4 3.6 26 \$93				415 \$415		\$508							
Digital Input																							
Analog Input										1 EA 3 2.6 26 \$68				50 \$50		\$117							
TOTAL THIS SHEET												\$217		\$508		\$725							

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY LOCATION FT. LEONARD WOOD, MISSOURI BLDG. NO. 1703										INVITATION NO./CONTRACT NO. DACA41-92-C-0098 CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER <input type="checkbox"/>				EFFECTIVE PRICING MARCH 1993 DRAWING NO.		DATE PREPARED 05-Apr-93 SHT OF					
STEAM HW CONVERTER SYS. NO. CV-1 TASK DESCRIPTION Control Relay										LABOR Total Hrs Unit Price 2.2 26		EQUIPMENT Unit Price Cost 43		MATERIAL Unit Price Cost 43		TOTAL \$99		CHECKED BY CEL SHIPPING Unit Wt			
Digital Output 1 EA 2 2.2 26																					
Analog Output 1 EA 4 4.1 26																					
Digital Input Pressure Switch (Elec) 1 EA 2 2.4 26																					
Pressure Switch (Plum) 1 EA 2 1.9 24																					
Analog Input Temp. Water (Elec) 1 EA 3 3.1 26																					
Temp. Water (Plum) 1 EA 2 2.1 24																					
TOTAL THIS SHEET																					

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY										INVITATION NO./CONTRACT NO.										EFFECTIVE PRICING				DATE PREPARED																																																																																													
LOCATION FT. LEONARD WOOD, MISSOURI										DACA41-92-C-0098										MARCH 1993				27-Mar-93																																																																																													
BLDG. NO. 1703										<input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER										DRAWING NO.				SHT OF																																																																																													
ELECTRIC DW HEATER										LABOR										MATERIAL										ESTIMATOR				KC				CHECKED BY CEL																																																																															
SYS. NO. DHW-1										Quantity										Unit										Price										Total										SHIPPING																																																																			
TASK DESCRIPTION										No. Of										Unit										Price										Total										Unit				Wt																																																															
Digital Output										1 EA										3										2.9										26										\$75										77										\$77										\$152																																					
Analog Output																																																																																																																					
Digital Input										1 EA										2										1.9										26										\$49										41										\$41										\$91																																					
Analog Input																																																																																																																					
TOTAL THIS SHEET																																																																																																																					

COST ESTIMATE

BUILDING 1705

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY LOCATION FT. LEONARD WOOD, MISSOURI BLDG. NO. 1705										INVITATION NO./CONTRACT NO. DACA41-92-C-0098 <input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER				EFFECTIVE PRICING MARCH 1993 DRAWING NO.		DATE PREPARED 27 - Mar - 93 SHT OF			
STEAM HW CONVERTER SYS. NO. CV-1 TASK DESCRIPTION Control Relay										LABOR Total Hrs 2.2 Unit Price 26		EQUIPMENT Unit Price Cost		MATERIAL Unit Price Cost		ESTIMATOR KC TOTAL \$43 \$99		CHECKED BY CEL SHIPPING Unit Wt	
Digital Output										1 EA 2 2.2 26		\$58		43		\$99			
Analog Output										1 EA 4 4.1 26		\$108		295		\$295		\$402	
Digital Input										1 EA 2 2.4 26		\$62		52		\$52		\$114	
Pressure Switch (Elec)										1 EA 2 1.9 24		\$47		51		\$51		\$97	
Analog Input										1 EA 3 3.1 26		\$81		222		\$222		\$303	
Temp. Water (Elec)										1 EA 2 2.1 24		\$52		65		\$65		\$117	
Temp. Water (Plum)																			
TOTAL THIS SHEET												\$403				\$728		\$1,132	

COST ESTIMATE

BUILDING 1711

COST ESTIMATE ANALYSIS

COST ESTIMATE ANALYSIS										INVITATION NO./CONTRACT NO.						EFFECTIVE PRICING		DATE PREPARED	
PROJECT		EMCS FEASIBILITY STUDY								DACA41-92-C-0098						MARCH 1993		27-Mar-93	
LOCATION		FT. LEONARD WOOD, MISSOURI								<input type="checkbox"/> CODE A		<input checked="" type="checkbox"/> CODE B		<input type="checkbox"/> CODE C		DRAWING NO.		SHT OF	
BLDG. NO.		1711								<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>				CHECKED BY CEL	
MULTIZONE AHU		SYS. NO.		AHU - 1		Quantity		LABOR		EQUIPMENT		MATERIAL		ESTIMATOR		KC		SHIPPING	
TASK DESCRIPTION		No. Of Units	Unit Meas	MH/ Unit	Total Hrs	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost					Unit	Total Wt
Digital Output	Control Relay	1	EA	2	2.2	26	\$56							43	\$43		\$99		
	H/O/A & Control Relay		EA	3		26								77					
Analog Output	CPA (Damper)	6	EA	3	18.8	26	\$483							285	\$1,771		\$2,255		
	CPA (Valve)	2	EA	3	6.3	26	\$161							295	\$590		\$752		
Digital Input	Diff. Pressure Sw. (Fan)	1	EA	3	3.4	26	\$88							71	\$71		\$159		
	Diff. Pressure Sw. (Filter)	1	EA	3	3.4	26	\$88							71	\$71		\$159		
	End Position Switch		EA	2		26								69					
Analog Input	Temp. Space	5	EA	3	13.1	26	\$338							174	\$870		\$1,208		
	Temp. Duct	2	EA	3	6.3	26	\$161							185	\$370		\$531		
	Temp. Avg. Duct	2	EA	4	7.3	26	\$187							190	\$380		\$567		
	RH Space	1	EA	3	2.6	26	\$68							240	\$240		\$307		
	Position	1	EA	3	3.1	26	\$81							191	\$191		\$271		
TOTAL THIS SHEET							\$1,711								\$4,597		\$6,307		

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COST ESTIMATE ANALYSIS

[illegible]

COST ESTIMATE

BUILDING 1712

COST ESTIMATE ANALYSIS

INVESTMENT NO./CONTRACT NO.										EFFECTIVE PRICING		DATE PREPARED			
DACA41-92-C-0088										MARCH 1983		27-Mar-93			
<div> <input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER </div>										DRAWING NO.		SHT OF			
<div> <input type="checkbox"/> ESTIMATOR <input type="checkbox"/> KC </div>										CHECKED BY		CEL			
<div> <div>LABOR</div> <div> <div>Quantity</div> <div> <div>No. Of Units</div> <div>Unit</div> <div>MH/ Unit</div> <div>Total Hrs</div> </div> </div> </div>										EQUIPMENT		MATERIAL		TOTAL	
<div> <div>Unit</div> <div>Price</div> <div>Cost</div> </div>										Unit		Price		Cost	
<div> <div>Unit</div> <div>Price</div> <div>Cost</div> </div>										Unit		Price		Cost	
SINGLE ZONE & VAV AHU SYS. NO. AHU-1 TASK DESCRIPTION Digital Output Control Relay H/O/A & Control Relay										43	\$43	\$99			
Analog Output CPA (Damper) CPA (Valve)										295	\$295	\$378			
Digital Input Diff. Pressure Sw. (Fan) Diff. Pressure Sw. (Filter) End Position Switch										71	\$71	\$159			
Analog Input Temp. Space Temp. Avg. Duct Position Temp. Duct										174	\$348	\$483			
TOTAL THIS SHEET											\$2,169	\$3,113			

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY										INVITATION NO./CONTRACT NO.										EFFECTIVE PRICING		DATE PREPARED	
LOCATION FT. LEONARD WOOD, MISSOURI										DACA41-92-C-0098										MARCH 1993		27-Mar-93	
BLDG. NO. 1712										<input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER										DRAWING NO.		SHT OF	
STEAM HW CONVERTER										LABOR										ESTIMATOR		CHECKED BY	
SYS. NO. CV-1										MATERIAL										KC		CEL	
TASK DESCRIPTION										Unit Price										TOTAL		SHIPPING	
Digital Output										43										\$99			
Analog Output										295										\$402			
Digital Input										52										\$114			
Analog Input										65										\$117			
TOTAL THIS SHEET																				\$728		\$1,132	

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY LOCATION FT. LEONARD WOOD, MISSOURI BLDG. NO. 1712										INVITATION NO./CONTRACT NO. DACA41-92-C-0098				EFFECTIVE PRICING MARCH 1993		DATE PREPARED 27 - Mar - 93	
FAN COIL SYS. NO. FC-1 TASK DESCRIPTION Digital Output										<input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C OTHER		DRAWING NO.		SHT OF			
LABOR Quantity No. Of Units Meas Unit 1 EA 2 2.2 26 26 26 26										EQUIPMENT Unit Price Cost Unit Price Cost		MATERIAL Unit Price Cost Unit Price Cost		ESTIMATOR KC TOTAL		CHECKED BY CEL SHIPPING Unit Wt Unit Wt	
Analog Output ACU (Fan Coil)										43 \$56 \$93 415 \$415 \$508		\$99					
Digital Input																	
Analog Input Temp. Space (RTD Only)										50 \$50 \$117							
TOTAL THIS SHEET										\$217 \$508 \$725							

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY LOCATION FT. LEONARD WOOD, MISSOURI BLDG. NO. 1712										INVITATION NO./CONTRACT NO. DACA41-92-C-0098 <input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER				EFFECTIVE PRICING MARCH 1993 DRAWING NO.		DATE PREPARED 27-Mar-93 SHT OF					
ELECTRIC DW HEATER SYS. NO. DHW-1 TASK DESCRIPTION H/O/A & Control Relay										LABOR Total Hrs 2.9 Unit Price 26		EQUIPMENT Unit Price Cost		MATERIAL Unit Price Cost		ESTIMATOR Unit Price Cost		KC TOTAL Unit Price Cost		CHECKED BY CEL SHIPPING Unit Price Cost	
Digital Output 1 EA \$75										26		77		\$152		\$118		\$242			
Analog Output																					
Digital Input 1 EA \$49										26		41		\$91		\$118		\$242			
Analog Input																					
TOTAL THIS SHEET																					

COST ESTIMATE

BUILDING 1714

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY LOCATION FT. LEONARD WOOD, MISSOURI BLDG. NO. 1714										INVITATION NO./CONTRACT NO. DACA41-92-C-0098 CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER <input type="checkbox"/>				EFFECTIVE PRICING MARCH 1983 DRAWING NO.		DATE PREPARED 27 - Mar - 83 SHT OF			
MULTIZONE AHU SYS. NO. AHU-2 TASK DESCRIPTION										ESTIMATOR		KC		CHECKED BY		CEL			
Digital Output Control Relay H/O/A & Control Relay										LABOR Total Hrs Unit Price Unit Price Unit Price		EQUIPMENT Unit Price Cost		MATERIAL Unit Price Cost		TOTAL Unit Price Cost		SHIPPING Unit Price Cost	
Analog Output CPA (Damper) CPA (Valve)										18.8 6.3 3		26 26 26		\$483 \$161		295 295		\$1,771 \$590 \$2,255 \$752	
Digital Input Diff. Pressure Sw. (Fan) Diff. Pressure Sw. (Filter) End Position Switch										3.4 3.4 2		26 26 26		\$88 \$88		71 71 69		\$71 \$71 \$159 \$159	
Analog Input Temp. Space Temp. Duct Temp. Avg. Duct RH Space Position										13.1 6.3 7.3 2.6 3.1		26 26 26 26 26		\$338 \$161 \$187 \$68 \$81		174 185 190 240 191		\$870 \$370 \$380 \$240 \$191 \$1,208 \$531 \$567 \$307 \$271	
TOTAL THIS SHEET										\$1,711		\$4,597		\$6,307		\$6,307			

COST ESTIMATE ANALYSIS

COST ESTIMATE ANALYSIS										INVITATION NO./CONTRACT NO.				EFFECTIVE PRICING		DATE PREPARED	
PROJECT		EMCS FEASIBILITY STUDY		DACA41-92-C-0098						MARCH 1993		27-Mar-93					
LOCATION		FT. LEONARD WOOD, MISSOURI		<input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER						DRAWING NO.		SHT OF					
BLDG. NO.		1714		LABOR				EQUIPMENT		MATERIAL		ESTIMATOR		CHECKED BY			
AHU		SYS. NO.		MH/		Total		Unit		Unit		Unit		SHIPPING			
TASK DESCRIPTION		Hv-1		Unit		Hrs		Price		Cost		Price		Total			
Digital Output		Control Relay		1 EA		2.2		26		\$56		43		\$99			
Analog Output		CPA (Valve)		1 EA		3.1		26		\$61		295		\$376			
Digital Input		Diff. Pressure Sw. (Fan)		1 EA		3.4		26		\$88		71		\$159			
Analog Input		Temp. Space		2 EA		5.3		26		\$135		174		\$483			
TOTAL THIS SHEET										\$360				\$1,117			

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COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY LOCATION FT. LEONARD WOOD, MISSOURI BLDG. NO. 1714										INVITATION NO./CONTRACT NO. DACA41-92-C-0098 <input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER				EFFECTIVE PRICING MARCH 1993 DRAWING NO.		DATE PREPARED 27-Mar-93 SHT OF					
										ESTIMATOR		KC		CHECKED BY		CEL					
										MATERIAL		TOTAL		SHIPPING							
										Unit Price		Cost		Unit Wt		Total Wt					
DUAL TEMP WATER PUMP SYS. NO. CHW PUMP TASK DESCRIPTION Digital Output Control Relay										1 EA		2.2 2.2		26 26		\$56		43		\$99	
Analog Output																					
Digital Input										1 EA		2.4 2.4		26 26		\$62		52			
Pressure Switch (Elec)										1 EA		1.9 1.9		24 24		\$47		51			
Pressure Switch (Plum)																					
Analog Input										2 EA		5.3 5.3		26 26		\$135		174			
Temp. Space										2 EA		6.3 6.3		26 26		\$161		222			
Temp. Water (Elec)										2 EA		4.3 4.3		24 24		\$104		65			
Temp. Water (Plum)																					
TOTAL THIS SHEET																		\$565			
																		\$1,068			
																		\$1,633			

COST ESTIMATE

BUILDING 1720
AND TYPICAL FOR
1723, 1728, 1729, 1734,
1735, 1761, 1765, 1767,
1769, 1773, AND 1776

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY										INVITATION NO./CONTRACT NO.										EFFECTIVE PRICING		DATE PREPARED	
LOCATION FT. LEONARD WOOD, MISSOURI										DACA41-92-C-0098										MARCH 1993		27 - Mar - 93	
BLDG. NO. 1720										<input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER										DRAWING NO.		SHT OF	
FAN COIL										LABOR										ESTIMATOR		CHECKED BY	
SYS. NO. FC-1										MATERIAL										TOTAL		SHIPPING	
TASK DESCRIPTION										Unit Price										Cost		Unit Wt	
Digital Output										43										\$43		\$99	
Analog Output										415										\$415		\$508	
Digital Input																							
Analog Input										50										\$50		\$117	
TOTAL THIS SHEET																				\$508		\$725	

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY										INVITATION NO./CONTRACT NO.				EFFECTIVE PRICING		DATE PREPARED			
LOCATION FT. LEONARD WOOD, MISSOURI										DACA41-92-C-0098				MARCH 1993		27-Mar-93			
BLDG. NO. 1720										<input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER				DRAWING NO.		SHT OF			
STEAM HW CONVERTER										ESTIMATOR		KC		CHECKED BY		CEL			
SYS. NO. CV-1										LABOR		EQUIPMENT		MATERIAL		TOTAL			
TASK DESCRIPTION										Quantity		Unit		Unit		Unit			
Control Relay										No. Of Units	Unit Meas	MH/ Unit	Total Hrs	Unit Price	Cost	Unit Price	Cost		
Digital Output										1	EA	2	2.2	26	\$56		43	\$43	\$99
Analog Output										1	EA	4	4.1	26	\$106		295	\$295	\$402
Digital Input										1	EA	2	2.4	26	\$62		52	\$52	\$114
Pressure Switch (Elec)										1	EA	2	1.9	24	\$47		51	\$51	\$97
Pressure Switch (Plum)																			
Analog Input										1	EA	3	3.1	26	\$81		222	\$222	\$303
Temp. Water (Elec)										1	EA	2	2.1	24	\$52		65	\$65	\$117
Temp. Water (Plum)																			
TOTAL THIS SHEET															\$403			\$728	\$1,132

COST ESTIMATE

**BUILDING 1721
AND TYPICAL FOR
1727, 1736, 1760, 1770, AND 1772**

COST ESTIMATE

**BUILDING 1724
AND TYPICAL FOR
1722, 1725, 1726, 1730,
1731, 1732, 1733, 1762,
1763, 1764, 1766, 1768
1771, 1774, AND 1775**

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY										INVITATION NO./CONTRACT NO.										EFFECTIVE PRICING		DATE PREPARED	
LOCATION FT. LEONARD WOOD, MISSOURI										DACA41-92-C-0098										MARCH 1993		27-Mar-93	
BLDG. NO. 1724										<input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER										DRAWING NO.		SHT OF	
STEAM HW CONVERTER										ESTIMATOR										KC		CHECKED BY	
SYS. NO. CV-1										LABOR										MATERIAL		SHIPPING	
TASK DESCRIPTION										Unit Price										Unit Price		Unit Price	
Control Relay										43										\$43		\$99	
Digital Output																							
Analog Output										295										\$295		\$402	
Digital Input										52										\$52		\$114	
Pressure Switch (Elec)										51										\$51		\$97	
Pressure Switch (Plum)																							
Analog Input										222										\$222		\$303	
Temp. Water (Elec)										65										\$65		\$117	
Temp. Water (Plum)																							
TOTAL THIS SHEET																				\$728		\$1,132	

COST ESTIMATE

BUILDING 1740

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY LOCATION FT. LEONARD WOOD, MISSOURI BLDG. NO. 1740										INVITATION NO./CONTRACT NO. DACA41-92-C-0098 CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER <input type="checkbox"/>				EFFECTIVE PRICING MARCH 1993 DRAWING NO.		DATE PREPARED 27-Mar-93 SHT OF	
AHU		Quantity No. Of Units		LABOR MH/ Unit Total Hrs		EQUIPMENT Unit Price Cost		MATERIAL Unit Price Cost		ESTIMATOR KC		CHECKED BY CEL					
SYS. NO. HV-1		TASK DESCRIPTION		Unit Price		Unit Price		Unit Price		TOTAL		SHIPPING Unit Wt					
Digital Output		Control Relay		1 EA		2.2 26		\$56		43		\$43 \$99					
Analog Output		CPA (Valve)		1 EA		3.1 26		\$81		295		\$295 \$376					
Digital Input		Diff. Pressure Sw. (Fan)		1 EA		3.4 26		\$88		71		\$71 \$159					
Analog Input		Temp. Space		2 EA		5.3 26		\$135		174		\$348 \$483					
TOTAL THIS SHEET		\$360		\$757		\$1,117		PAGE		DA FORM 5418-R, APR 85		92					

COST ESTIMATE ANALYSIS

PROJECT										INVITATION NO./CONTRACT NO.										EFFECTIVE PRICING		DATE PREPARED	
LOCATION										DACA41-92-C-0098										MARCH 1993		27-Mar-93	
BLDG. NO.										<input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER										DRAWING NO.		SHT OF	
AHU										ESTIMATOR										KC		CHECKED BY	
SYS. NO.										LABOR										MATERIAL		SHIPPING	
TASK DESCRIPTION										Unit Price										Unit Price		Unit Wt	
Control Relay										26										43		\$99	
Digital Output																							
Analog Output										295										\$295		\$376	
Digital Input										71										\$71		\$159	
Analog Input										174										\$348		\$483	
TOTAL THIS SHEET										\$360										\$757		\$1,117	

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY										INVITATION NO./CONTRACT NO.				EFFECTIVE PRICING		DATE PREPARED	
LOCATION FT. LEONARD WOOD, MISSOURI										DACA41-92-C-0098				MARCH 1993		27-Mar-93	
BLDG. NO. 1740										<input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER				DRAWING NO.		SHT OF	
STEAM HW CONVERTER										ESTIMATOR		KC		CHECKED BY		CEL	
SYS. NO. CV-1										MATERIAL		TOTAL		SHIPPING		Unit	
TASK DESCRIPTION										Unit		Cost		Unit		Wt	
Digital Output										43		\$43					
Analog Output										295		\$295					
Digital Input										52		\$52					
Analog Input										65		\$65					
Control Relay																	
CPA (Electric)																	
Pressure Switch (Elec)																	
Pressure Switch (Plum)																	
Temp. Water (Elec)																	
Temp. Water (Plum)																	
TOTAL THIS SHEET																	

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY LOCATION FT. LEONARD WOOD, MISSOURI BLDG. NO. 1740										INVITATION NO./CONTRACT NO. DACA41-92-C-0098 <input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER				EFFECTIVE PRICING MARCH 1993 DRAWING NO.		DATE PREPARED 05-Apr-93 SHT OF	
DUAL TEMP WATER PUMP SYS. NO. CHW PUMP TASK DESCRIPTION Control Relay										LABOR Total Hrs 2.2 Unit Price 26		EQUIPMENT Unit Price Cost		MATERIAL Unit Price Cost		TOTAL \$56 \$43 \$99	
Digital Output 1 EA 2 2.2 26																	
Analog Output																	
Digital Input Pressure Switch (Elec) 1 EA 2 2.4 26 \$62 Pressure Switch (Plum) 1 EA 2 1.9 24 \$47																	
Analog Input Temp. Space 2 EA 3 5.3 26 \$135 Temp. Water (Elec) 2 EA 3 6.3 26 \$161 Temp. Water (Plum) 2 EA 2 4.3 24 \$104																	
TOTAL THIS SHEET																\$1,633	

COST ESTIMATE ANALYSIS

PROJECT		INVITATION NO./CONTRACT NO.										EFFECTIVE PRICING		DATE PREPARED			
LOCATION		DACA41-92-C-0098										MARCH 1993		27 - Mar - 93			
BLDG. NO.		<input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER										DRAWING NO.		SHT OF			
MULTIZONE AHU		LABOR										ESTIMATOR		CHECKED BY		CEL	
SYS. NO.		AHU-2										TOTAL		SHIPPING			
TASK DESCRIPTION		Quantity		MH/		Total		Unit		Cost		Unit		Total		Wt	
		No. Of	Unit	Unit	Unit	Unit	Hrs	Price	Price	Price	Price	Price	Price	Price	Price	Price	Price
Digital Output		1	EA	2	2.2	26											
Control Relay			EA	3		26											
H/O/A & Control Relay																	
Analog Output		6	EA	3	18.8	26											
CPA (Dampert)		2	EA	3	6.3	26											
CPA (Valve)																	
Digital Input		1	EA	3	3.4	26											
Diff. Pressure Sw. (Fan)		1	EA	3	3.4	26											
Diff. Pressure Sw. (Filter)																	
End Position Switch																	
Analog Input		5	EA	3	13.1	26											
Temp. Space		2	EA	3	6.3	26											
Temp. Duct		2	EA	4	7.3	26											
Temp. Avg. Duct		1	EA	3	2.6	26											
RH Space		1	EA	3	3.1	26											
Position																	
TOTAL THIS SHEET																	

COST ESTIMATE

BUILDING 1750

COST ESTIMATE ANALYSIS

[illegible]

COST ESTIMATE ANALYSIS

COST ESTIMATE ANALYSIS										INVITATION NO./CONTRACT NO.				EFFECTIVE PRICING		DATE PREPARED	
PROJECT		EMCS FEASIBILITY STUDY		DAC441-92-C-0098						MARCH 1993		27-Mar-93					
LOCATION		FT. LEONARD WOOD, MISSOURI		CODE A <input type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/>						DRAWING NO.		SHT OF					
BLDG. NO.		1750		OTHER <input type="checkbox"/>						ESTIMATOR		CHECKED BY					
MULTITZONE AHU				Quantity		LABOR		EQUIPMENT		MATERIAL		TOTAL		SHIPPING			
SYS. NO.	AHU-2	No. Of Units	Unit Meas	MH/ Unit	Total Hrs	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost	Unit	Total	Unit	Total		
TASK DESCRIPTION																	
Digital Output	Control Relay	1	EA	2	2.2	26	\$56			43	\$43		\$99				
	H/O/A & Control Relay		EA	3		26				77							
Analog Output																	
	CPA (Damper)	6	EA	3	18.8	26	\$483			295	\$1,771		\$2,255				
	CPA (Valve)	2	EA	3	6.3	26	\$161			295	\$590		\$752				
Digital Input																	
	Diff. Pressure Sw. (Fan)	1	EA	3	3.4	26	\$88			71	\$71		\$159				
	Diff. Pressure Sw. (Filter)	1	EA	3	3.4	26	\$88			71	\$71		\$159				
	End Position Switch		EA	2		26				69							
Analog Input																	
	Temp. Space	5	EA	3	13.1	26	\$338			174	\$870		\$1,208				
	Temp. Duct	2	EA	3	6.3	26	\$161			185	\$370		\$531				
	Temp. Avg. Duct	2	EA	4	7.3	26	\$187			190	\$380		\$567				
	RH Space	1	EA	3	2.6	26	\$68			240	\$240		\$307				
	Position	1	EA	3	3.1	26	\$81			191	\$191		\$271				
TOTAL THIS SHEET							\$1,711						\$4,597		\$6,307		

PAGE

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COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY LOCATION FT. LEONARD WOOD, MISSOURI BLDG. NO. 1750										INVITATION NO./CONTRACT NO. DACA41-92-C-0098 <input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER				EFFECTIVE PRICING MARCH 1993 DRAWING NO.		DATE PREPARED 27-Mar-93 SHT OF	
AHU		Quantity No. Of Units		LABOR MH/ Unit Total Hrs		EQUIPMENT Unit Price Cost		MATERIAL Unit Price Cost		ESTIMATOR KC		CHECKED BY CEL					
SYS. NO. HV-2		TASK DESCRIPTION		Unit Price		Unit Price		Unit Price		TOTAL		SHIPPING Unit Wt					
Digital Output		Control Relay		1 EA 2 2.2 26		\$56		43		\$43		\$99					
Analog Output		CPA (Valve)		1 EA 3 3.1 26		\$81		295		\$295		\$376					
Digital Input		Diff. Pressure Sw. (Fan)		1 EA 3 3.4 26		\$88		71		\$71		\$159					
Analog Input		Temp. Space		2 EA 3 5.3 26		\$135		174		\$348		\$463					
TOTAL THIS SHEET						\$360				\$757		\$1,117					

COST ESTIMATE ANALYSIS

COST ESTIMATE ANALYSIS										INVITATION NO./CONTRACT NO.				EFFECTIVE PRICING		DATE PREPARED			
PROJECT		EMCS FEASIBILITY STUDY		LOCATION		FT. LEONARD WOOD, MISSOURI		BLDG. NO. 1750		DACA41-92-C-0098				MARCH 1993		27-Mar-93			
STEAM HW CONVERTER		CV-1		TASK DESCRIPTION		Control Relay		Quantity		LABOR		EQUIPMENT		MATERIAL		ESTIMATOR			
SYS. NO.	CV-1	Task Description	No. Of Units	Unit Meas	MH/ Unit	Total Hrs	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost	Unit Price		
Digital Output			1	EA	2	2.2	26	\$58						43	\$43	\$99			
Analog Output		CPA (Electric)	1	EA	4	4.1	26	\$108						295	\$295	\$402			
Digital Input		Pressure Switch (Elec)	1	EA	2	2.4	26	\$62						52	\$52	\$114			
		Pressure Switch (Plum)	1	EA	2	1.9	24	\$47						51	\$51	\$97			
Analog Input		Temp. Water (Elec)	1	EA	3	3.1	26	\$81						222	\$222	\$303			
		Temp. Water (Plum)	1	EA	2	2.1	24	\$52						65	\$65	\$117			
TOTAL THIS SHEET																	\$403	\$728	\$1,132

COST ESTIMATE

BUILDING 2100

COST ESTIMATE ANALYSIS

PROJECT										INVOITATION NO./CONTRACT NO.				EFFECTIVE PRICING		DATE PREPARED														
LOCATION										DACA41-92-C-0098				MARCH 1983		27-Mar-83														
BLDG. NO.										<input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER				DRAWING NO.		SHT OF														
SINGLE ZONE & VAV AHU										LABOR				EQUIPMENT		MATERIAL		ESTIMATOR		KC		CHECKED BY		CEL						
SYS. NO.										Quantity		MH/		Total		Unit		Unit		Unit		Unit		Unit						
TASK DESCRIPTION										No. Of	Unit	Meas	Unit	Hrs	Unit	Price	Cost	Unit	Price	Cost	Unit	Price	Cost	Unit	Price	Cost	Unit	Price		
Digital Output										1	EA	2	2.2	26	\$56															
Control Relay											EA	3		26																
H/O/A & Control Relay																														
Analog Output										1	EA	3	3.1	26	\$81															
CPA (Damper)										2	EA	3	6.3	26	\$161															
CPA (Valve)																														
Digital Input										1	EA	3	3.4	26	\$88															
Diff. Pressure Sw. (Fan)										1	EA	3	3.4	26	\$88															
Diff. Pressure Sw. (Filter)																														
End Position Switch											EA	2		26																
Analog Input										2	EA	3	5.3	26	\$135															
Temp. Space										1	EA	4	3.6	26	\$93															
Temp. Avg. Duct										1	EA	3	3.1	26	\$81															
Position										2	EA	3	6.3	26	\$161															
Temp. Duct																														
TOTAL THIS SHEET															\$944															

COST ESTIMATE ANALYSIS

COST ESTIMATE ANALYSIS										INVITATION NO./CONTRACT NO.			EFFECTIVE PRICING		DATE PREPARED												
PROJECT EMCS FEASIBILITY STUDY										DACA41-92-C-0098			MARCH 1993		27-Mar-93												
LOCATION FT. LEONARD WOOD, MISSOURI										CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/>			DRAWING NO.		SHT OF												
BLDG. NO. 2100										OTHER <input type="checkbox"/>			ESTIMATOR		CHECKED BY CEL												
SINGLE ZONE & VAV AHU										LABOR			EQUIPMENT			MATERIAL			TOTAL			SHIPPING					
SYS. NO.		AHU-3		TASK DESCRIPTION		Quantity		MH/		Total		Unit		Price		Cost		Unit		Price		Cost		Unit		Total	
						No. Of Units		Unit		Hrs		Price		Price		Cost		Price		Price		Cost		Unit		Wt	
Digital Output				Control Relay		1 EA		2		2.2		26				\$56				43		\$43				\$99	
				H/O/A & Control Relay		EA		3				26								77							
Analog Output				CPA (Damper)		1 EA		3		3.1		26				\$81				295		\$295				\$376	
				CPA (Valve)		2 EA		3		6.3		26				\$161				295		\$590				\$752	
Digital Input				Diff. Pressure Sw. (Fan)		1 EA		3		3.4		26				\$88				71		\$71				\$159	
				Diff. Pressure Sw. (Filter)		1 EA		3		3.4		26				\$88				71		\$71				\$159	
				End Position Switch		EA		2				26								69							
Analog Input				Temp. Space		2 EA		3		5.3		26				\$135				174		\$348				\$483	
				Temp. Avg. Duct		1 EA		4		3.6		26				\$93				190		\$190				\$283	
				Position		1 EA		3		3.1		26				\$81				191		\$191				\$271	
				Temp. Duct		2 EA		3		6.3		26				\$161				185		\$370				\$531	
TOTAL THIS SHEET																\$944										\$2,169	

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY										INVITATION NO./CONTRACT NO.										EFFECTIVE PRICING				DATE PREPARED																			
LOCATION FT. LEONARD WOOD, MISSOURI										DACA41-92-C-0088										MARCH 1993				27-Mar-93																			
BLDG. NO. 2100										<input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER										DRAWING NO.				SHT OF																			
SINGLE ZONE & VAV AHU										LABOR										EQUIPMENT				MATERIAL				ESTIMATOR				KC				CHECKED BY				CEL			
SYS. NO. AHU-4										Quantity										MH/				Unit				Total				Unit				Total							
TASK DESCRIPTION										No. Of										Unit				Price				Cost				Unit				Price				Cost			
Digital Output										1 EA										2				2.2				26				43				\$99							
H/O/A & Control Relay										EA										3				26				77															
Analog Output										1 EA										3				3.1				26				295				\$378							
CPA (Damper)										2 EA										3				6.3				26				295				\$752							
CPA (Valve)																																											
Digital Input										1 EA										3				3.4				26				71				\$159							
Diff. Pressure Sw. (Fan)										1 EA										3				3.4				26				71				\$159							
Diff. Pressure Sw. (Filter)										EA										2				26				69															
End Position Switch																																											
Analog Input										2 EA										3				5.3				26				174				\$483							
Temp. Space										1 EA										4				3.6				26				190				\$283							
Temp. Avg. Duct										1 EA										3				3.1				26				191				\$271							
Position										2 EA										3				6.3				26				185				\$531							
Temp. Duct																																											
TOTAL THIS SHEET																																											

COST ESTIMATE ANALYSIS

COST ESTIMATE ANALYSIS														INVITATION NO./CONTRACT NO.				EFFECTIVE PRICING		DATE PREPARED	
PROJECT		EMCS FEASIBILITY STUDY				DACA41-92-C-0098				MARCH 1993		27-Mar-93									
LOCATION		FT. LEONARD WOOD, MISSOURI				CODE A <input type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/>				DRAWING NO.		SHT		OF							
BLDG. NO.		2100				OTHER <input type="checkbox"/>															
SINGLE ZONE & VAV AHU		Quantity		LABOR		EQUIPMENT		MATERIAL		ESTIMATOR		KC		CHECKED BY							
SYS. NO.	AHU-7	No. Of Units	Unit Meas	MH/ Unit	Total Hrs	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost						
TASK DESCRIPTION																					
Digital Output	Control Relay	1	EA	2	2.2	26	\$56			43	\$43		\$99								
	H/O/A & Control Relay		EA	3		26				77											
Analog Output																					
	CPA (Damper)	1	EA	3	3.1	26	\$81			295	\$295		\$376								
	CPA (Valve)	2	EA	3	6.3	26	\$161			295	\$590		\$752								
Digital Input																					
	Diff. Pressure Sw. (Fan)	1	EA	3	3.4	26	\$88			71	\$71		\$159								
	Diff. Pressure Sw. (Filter)	1	EA	3	3.4	26	\$88			71	\$71		\$159								
	End Position Switch		EA	2		26				69											
Analog Input																					
	Temp. Space	2	EA	3	5.3	26	\$135			174	\$348		\$483								
	Temp. Avg. Duct	1	EA	4	3.6	26	\$93			190	\$190		\$283								
	Position	1	EA	3	3.1	26	\$81			191	\$191		\$271								
	Temp. Duct	2	EA	3	6.3	26	\$161			185	\$370		\$531								
TOTAL THIS SHEET							\$944						\$2,169		\$3,113						

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COST ESTIMATE ANALYSIS

PROJECT										INVITATION NO./CONTRACT NO.										EFFECTIVE PRICING		DATE PREPARED			
EMCS FEASIBILITY STUDY										DACA41-92-C-0098										MARCH 1993		27-Mar-93			
LOCATION FT. LEONARD WOOD, MISSOURI										CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/>										DRAWING NO.		SHT OF			
BLDG. NO. 2100										OTHER <input type="checkbox"/>															
HOT WATER BOILER										EQUIPMENT										ESTIMATOR		CHECKED BY			
SYS. NO. BLR-1										MATERIAL										KC		CEL			
TASK DESCRIPTION										Unit Price										Cost		SHIPPING			
No. Of Units										Unit Price										Cost		Unit Wt			
Quantity										Unit Price										Cost		Unit Wt			
Total Hrs										Unit Price										Cost		Unit Wt			
MH/ Unit										Unit Price										Cost		Unit Wt			
EA										Unit Price										Cost		Unit Wt			
Digital Output										Control Relay										\$58		\$43		\$99	
Analog Output										CPA (Electric)										\$106		\$295		\$402	
Digital Input										Pressure Switch (Elec)										26					
										Pressure Switch (Plum)										24		\$51		\$97	
										Auxiliary Contact										26		\$43		\$92	
										Status Relay										26		\$41		\$91	
Analog Input										Temp. Water (Elec)										\$161		\$444		\$605	
										Temp. Water (Plum)										\$104		\$130		\$234	
TOTAL THIS SHEET																				\$572		\$1,048		\$1,620	

COST ESTIMATE

BUILDING 2105

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY LOCATION FT. LEONARD WOOD, MISSOURI BLDG. NO. 2105										INVITATION NO./CONTRACT NO. DACA41-92-C-0098 <input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER				EFFECTIVE PRICING MARCH 1993 DRAWING NO.		DATE PREPARED 27-Mar-93 SHT OF			
AIR COOLED DX COMPRESSOR SYS. NO. ACCU-1										ESTIMATOR		KC		CHECKED BY CEL					
TASK DESCRIPTION Control Relay										MATERIAL		TOTAL		SHIPPING					
Quantity No. Of Units		Unit Meas		LABOR MH/ Unit		Total Hrs		Unit Price		Cost		Unit Price		Cost		Unit Wt		Total Wt	
1		EA		2		2.2		26		\$56		43		\$43					
Digital Output																			
Analog Output																			
1		EA		2		1.9		26		\$49		41		\$41					
Digital Input																			
Analog Input																			
TOTAL THIS SHEET														\$85				\$190	

COST ESTIMATE

BUILDING 2240

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY										INVITATION NO./CONTRACT NO.				EFFECTIVE PRICING		DATE PREPARED	
LOCATION FT. LEONARD WOOD, MISSOURI										DACA41-92-C-0098				MARCH 1993		27 - Mar - 93	
BLDG. NO. 2240										<input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER				DRAWING NO.		SHT OF	
AHU										ESTIMATOR		KC		CHECKED BY		CEL	
SYS. NO. AHU-1										LABOR		EQUIPMENT		MATERIAL		TOTAL	
TASK DESCRIPTION										MH/ Unit		Unit Price		Unit Price		Unit Price	
Digital Output										Total Hrs		Cost		Cost		Cost	
Control Relay										2 2.2		\$56		43		\$99	
Analog Output										1 EA		\$81		295		\$376	
Digital Input										1 EA		\$88		71		\$159	
Diff. Pressure Sw. (Fan)										3 3.4							
Analog Input										2 EA		\$135		174		\$483	
Temp. Space										3 5.3							
TOTAL THIS SHEET												\$380				\$757	
																\$1,117	

COST ESTIMATE ANALYSIS

[illegible]

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY LOCATION FT. LEONARD WOOD, MISSOURI BLDG. NO. 2240										INVITATION NO./CONTRACT NO. DACA41-92-C-0098 CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER <input type="checkbox"/>										EFFECTIVE PRICING MARCH 1993 DRAWING NO.		DATE PREPARED 27 - Mar - 93 SHT OF					
UNIT HEADER SYS. NO. UH-3&4 TASK DESCRIPTION Digital Output Control Relay										LABOR No. Of Units 1 EA		Quantity Unit Meas 1 EA		Unit Price Unit Price 26		Cost Cost \$56		EQUIPMENT Unit Price 43		MATERIAL Unit Price 43		ESTIMATOR Cost \$43		KC TOTAL \$99		CHECKED BY SHIPPING Unit Wt	
Analog Output																											
Digital Input										1 EA		26		\$49		43		\$43		\$92							
Analog Input										1 EA		26		\$88		174		\$174		\$242							
Temp. Space																											
TOTAL THIS SHEET														\$173				\$280		\$433							

COST ESTIMATE

BUILDING 2250

COST ESTIMATE ANALYSIS

INVITATION NO./CONTRACT NO.

EFFECTIVE PRICING

DATE PREPARED

DACA41-92-C-0098

27-Mar-93

27-Mar-93

PROJECT	EMCS FEASIBILITY STUDY
1.00	1.00
2.00	2.00
3.00	3.00
4.00	4.00
5.00	5.00
6.00	6.00
7.00	7.00
8.00	8.00
9.00	9.00
10.00	10.00
11.00	11.00
12.00	12.00
13.00	13.00
14.00	14.00
15.00	15.00
16.00	16.00
17.00	17.00
18.00	18.00
19.00	19.00
20.00	20.00
21.00	21.00
22.00	22.00
23.00	23.00
24.00	24.00
25.00	25.00
26.00	26.00
27.00	27.00
28.00	28.00
29.00	29.00
30.00	30.00
31.00	31.00
32.00	32.00
33.00	33.00
34.00	34.00
35.00	35.00
36.00	36.00
37.00	37.00
38.00	38.00
39.00	39.00
40.00	40.00
41.00	41.00
42.00	42.00
43.00	43.00
44.00	44.00
45.00	45.00
46.00	46.00
47.00	47.00
48.00	48.00
49.00	49.00
50.00	50.00
51.00	51.00
52.00	52.00
53.00	53.00
54.00	54.00
55.00	55.00
56.00	56.00
57.00	57.00
58.00	58.00
59.00	59.00
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61.00	61.00
62.00	62.00
63.00	63.00
64.00	64.00
65.00	65.00
66.00	66.00
67.00	67.00
68.00	68.00
69.00	69.00
70.00	70.00
71.00	71.00
72.00	72.00
73.00	73.00
74.00	74.00
75.00	75.00
76.00	76.00
77.00	77.00
78.00	78.00
79.00	79.00
80.00	80.00
81.00	81.00
82.00	82.00
83.00	83.00
84.00	84.00
85.00	85.00
86.00	86.00
87.00	87.00
88.00	88.00
89.00	89.00
90.00	90.00
91.00	91.00
92.00	92.00
93.00	93.00
94.00	94.00
95.00	95.00
96.00	96.00
97.00	97.00
98.00	98.00
99.00	99.00
100.00	100.00

LOCATION	FT. LEONARD WOOD, MISSOURI
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10
11	11
12	12
13	13
14	14
15	15
16	16
17	17
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19	19
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21	21
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45	45
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67	67
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72	72
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76	76
77	77
78	78
79	79
80	80
81	81
82	82
83	83
84	84
85	85
86	86
87	87
88	88
89	89
90	90
91	91
92	92
93	93
94	94
95	95
96	96
97	97
98	98
99	99
100	100

BLDG. NO. 2250

CODE A	X	CODE B	CODE C
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OTHER _____

SHT	OF
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<p>CHECKED BY CEL</p>

SHIPPING

Unit	Total
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WT	WT
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[illegible]

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[illegible][illegible]

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[illegible][illegible]

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[illegible][illegible]

COST ESTIMATE ANALYSIS

COST ESTIMATE ANALYSIS										INVITATION NO./CONTRACT NO.				EFFECTIVE PRICING		DATE PREPARED	
PROJECT		EMCS FEASIBILITY STUDY		FT. LEONARD WOOD, MISSOURI		DACA41-92-C-0098		MARCH 1993		27-Mar-93		DRAWING NO.		SHT OF			
BLDG. NO.		2250		CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/>		OTHER <input type="checkbox"/>		ESTIMATOR		KC		CHECKED BY		CEL			
FAN COIL		FC-1		LABOR		EQUIPMENT		MATERIAL		TOTAL		SHIPPING		Total			
SYS. NO.		FC-1		MH/ Unit		Total Hrs		Unit Price		Cost		Unit Price		Total Wt			
TASK DESCRIPTION		No. Of Units		Unit Meas		Unit Price		Cost		Unit Price		Cost		Total Wt			
Digital Output	Control Relay	1	EA	2	2.2	26	\$56										
Analog Output	ACU (Fan Coil)	1	EA	4	3.6	26	\$93										
Digital Input																	
Analog Input	Temp. Space (RTD Only)	1	EA	3	2.6	26	\$68										
TOTAL THIS SHEET							\$217						\$508		\$725		

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY LOCATION FT. LEONARD WOOD, MISSOURI BLDG. NO. 2250										INVITATION NO./CONTRACT NO. DACA41-92-C-0098				EFFECTIVE PRICING MARCH 1993		DATE PREPARED 27-Mar-93	
PERIMETER RADIATION SYS. NO. RAD-1										ESTIMATOR		KC		CHECKED BY CEL			
TASK DESCRIPTION										UNIT		PRICE		WGT			
Digital Output										Unit		Price		Wt			
Analog Output										Unit		Price		Wt			
Digital Input										Unit		Price		Wt			
Analog Input										Unit		Price		Wt			
TOTAL THIS SHEET										\$1,058		\$1,367					

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY										INVITATION NO./CONTRACT NO.				EFFECTIVE PRICING				DATE PREPARED															
LOCATION FT. LEONARD WOOD, MISSOURI										DACA41-92-C-0098				MARCH 1993				27-Mar-93															
BLDG. NO. 2250										<input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER				DRAWING NO.				SHT OF															
HOT WATER BOILER										LABOR				EQUIPMENT				MATERIAL				ESTIMATOR		KC		CHECKED BY CEL							
SYS. NO. BLR-1										Quantity				MH/				Total				Unit				SHIPPING							
TASK DESCRIPTION										No. Of				Unit				Hrs				Price				Cost				Total			
Digital Output										1 EA				2				2.2				26				\$56				43		\$99	
Analog Output										1 EA				4				4.1				26				\$106				295		\$402	
Digital Input										1 EA				2				1.9				24				\$47				51		\$97	
Pressure Switch (Elec)										1 EA				2				1.9				26				\$49				43		\$92	
Pressure Switch (Plum)										1 EA				2				1.9				26				\$49				41		\$91	
Auxiliary Contact										1 EA				2				1.9				26				\$49							
Status Relay										1 EA				2				1.9				26				\$49							
Temp. Water (Elec)										2 EA				3				6.3				26				\$161				222		\$805	
Temp. Water (Plum)										2 EA				2				4.3				24				\$104				65		\$234	
TOTAL THIS SHEET																																	

COST ESTIMATE

BUILDING 2273

COST ESTIMATE ANALYSIS

[illegible]

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY LOCATION FT. LEONARD WOOD, MISSOURI BLDG. NO. 2273										INVITATION NO./CONTRACT NO. DACA41-92-C-0098 <input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER				EFFECTIVE PRICING MARCH 1993 DRAWING NO.		DATE PREPARED 02-Apr-93 SHT OF			
SYS. NO. ELECTRIC DW HEATER DHW-1 TASK DESCRIPTION H/O/A & Control Relay										LABOR MH/ Unit Total Hrs 3 2.9 26		EQUIPMENT Unit Price Cost		MATERIAL Unit Price Cost		ESTIMATOR KC TOTAL \$75 \$77 \$152		CHECKED BY CEL SHIPPING Unit Wt	
Digital Output 1 EA H/O/A & Control Relay										1 26		26		77		\$152			
Analog Output																			
Digital Input 1 EA Status Relay										1 26		26		41		\$91			
Analog Input																			
TOTAL THIS SHEET														\$124		\$118		\$242	

COST ESTIMATE

BUILDING 2399

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY										INVITATION NO./CONTRACT NO. DACA41-92-C-0098				EFFECTIVE PRICING MARCH 1993		DATE PREPARED 27-Mar-93													
LOCATION FT. LEONARD WOOD, MISSOURI										CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/>				DRAWING NO.		SHT OF													
BLDG. NO. 2399										OTHER <input type="checkbox"/>																			
AIR COOLED DX COMPRESSOR										EQUIPMENT				MATERIAL		ESTIMATOR		KC		CHECKED BY CEL									
SYS. NO. ACCU-1										LABOR				Unit Price		Unit Price		Total		SHIPPING									
TASK DESCRIPTION										No. Of Units		Unit Meas		MH/ Unit		Total Hrs		Unit Price		Unit Price		Unit Wt							
Digital Output										1		EA		2		2.2		26		\$56		43		\$99					
Analog Output																													
Digital Input										1		EA		2		1.9		26		\$49		41		\$91					
Analog Input																													
TOTAL THIS SHEET																								\$105		\$85		\$190	

COST ESTIMATE ANALYSIS

PROJECT										INVITATION NO./CONTRACT NO.				EFFECTIVE PRICING		DATE PREPARED			
EMCS FEASIBILITY STUDY										DACA41-92-C-0098				MARCH 1993		27-Mar-93			
LOCATION FT. LEONARD WOOD, MISSOURI										CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/>				DRAWING NO.		SHT OF			
BLDG. NO. 2399										OTHER <input type="checkbox"/>				ESTIMATOR		CHECKED BY			
STEAM BOILER										LABOR				MATERIAL				SHIPPING	
SYS. NO. BLR-1										Total Hrs				Unit Price				Unit Wt	
TASK DESCRIPTION										MH/ Unit				Cost				Total	
Digital Output										No. Of Units				Unit Price				Total Wt	
Analog Output										EA				Cost				Total	
Digital Input										EA				Cost				Total	
Analog Input										EA				Cost				Total	
Auxiliary Contact										1	EA	2	1.9	26	\$49	43	\$43	\$92	
Status Relay										1	EA	2	1.9	26	\$49	41	\$41	\$91	
PSIG/PSID (Elec)										1	EA	3	3.1	26	\$81	202	\$202	\$283	
PSIG/PSID (Plum)										1	EA	2	2.1	24	\$52	55	\$55	\$107	
TOTAL THIS SHEET																	\$341	\$572	

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY LOCATION FT. LEONARD WOOD, MISSOURI BLDG. NO. 2399										INVITATION NO./CONTRACT NO. DACA41-92-C-0098				EFFECTIVE PRICING MARCH 1993		DATE PREPARED 27-Mar-93	
SYS. NO. DHW-1 TASK DESCRIPTION Digital Output H/O/A & Control Relay										CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER <input type="checkbox"/>		DRAWING NO.		SHT OF			
ELECTRIC DW HEATER										ESTIMATOR		KC		CHECKED BY CEL			
Quantity										LABOR		EQUIPMENT		MATERIAL		TOTAL	
No. Of Units										M/H Unit		Unit Price		Unit Price		Unit Price	
Meas										Hrs		Cost		Cost		Cost	
1 EA										3		2.9		26		77	
Status Relay										1 EA		2		1.9		26	
Analog Output										41		\$41		\$91		\$152	
Digital Input										\$124		\$118		\$242		\$152	
Analog Input										\$124		\$118		\$242		\$152	
TOTAL THIS SHEET										\$124		\$118		\$242		\$152	

COST ESTIMATE

BUILDING 2574

COST ESTIMATE

BUILDING 3210

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY LOCATION FT. LEONARD WOOD, MISSOURI BLDG. NO. 3210										INVITATION NO./CONTRACT NO. DACA41-92-C-0098 CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER <input type="checkbox"/>				EFFECTIVE PRICING MARCH 1993 DRAWING NO.		DATE PREPARED 27-Mar-93 SHT OF			
FAN COIL SYS. NO. FC-1 TASK DESCRIPTION Control Relay										LABOR MH/ Unit Total Hrs		EQUIPMENT Unit Price Cost		MATERIAL Unit Price Cost		ESTIMATOR KC TOTAL		CHECKED BY CEL SHIPPING Unit Wt	
Digital Output										1 EA 2.2 2		26 \$56		43 \$43		\$99			
Analog Output										1 EA 3.6 4		26 \$93		415 \$415		\$508			
Digital Input																			
Analog Input										1 EA 2.6 3		26 \$68		50 \$50		\$117			
TOTAL THIS SHEET												\$217		\$508		\$725			

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY LOCATION FT. LEONARD WOOD, MISSOURI BLDG. NO. 3210										INVITATION NO./CONTRACT NO. DACA41-92-C-0098 <input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER				EFFECTIVE PRICING MARCH 1993 DRAWING NO.		DATE PREPARED 27-Mar-93 SHT OF	
FAN COIL SYS. NO. FC-2		Quantity No. Of Units		LABOR MH/ Unit Total Hrs		EQUIPMENT Unit Price Cost		MATERIAL Unit Price Cost		ESTIMATOR Unit Price Cost		KC TOTAL Unit Price Cost		CHECKED BY CEL Unit Price Cost			
TASK DESCRIPTION Digital Output Control Relay		1 EA		2 2.2		26		\$56		43		\$43		\$99			
Analog Output ACU (Fan Coil)		1 EA		4 3.6		26		\$93		415		\$415		\$508			
Digital Input																	
Analog Input Temp. Space (RTD Only)		1 EA		3 2.6		26		\$68		50		\$50		\$117			
TOTAL THIS SHEET								\$217				\$508		\$725			

COST ESTIMATE

3211 3212, 3213, 3214
BUILDING 3215

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY LOCATION FT. LEONARD WOOD, MISSOURI BLDG. NO. 3211										INVITATION NO./CONTRACT NO. DACA41-92-C-0098 CODE A <input type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER <input type="checkbox"/>				EFFECTIVE PRICING MARCH 1993 DRAWING NO.		DATE PREPARED 27-Mar-93 SHT OF																			
FAN COIL SYS. NO. FC-3 TASK DESCRIPTION Control Relay										LABOR No. Of Units 1 EA		MH/ Unit 2		Total Hrs 2.2		Unit Price 26		Cost \$56		EQUIPMENT Unit Price 43		Cost \$43		MATERIAL Unit Price 43		Cost \$43		TOTAL \$99		ESTIMATOR KC		CHECKED BY CEL		SHIPPING Unit Wt	
Analog Output ACU (Fan Coil)										1 EA		4		3.6		26		\$93		415		\$415		\$508											
Digital Input																																			
Analog Input Temp. Space (RTD Only)										1 EA		3		2.6		26		\$68		50		\$50		\$117											
TOTAL THIS SHEET																\$217				\$508		\$725													

COST ESTIMATE

BUILDING 4052

COST ESTIMATE ANALYSIS

PROJECT										INVITATION NO./CONTRACT NO.										EFFECTIVE PRICING		DATE PREPARED			
LOCATION										DACA41-92-C-0098										MARCH 1993		27-Mar-93			
BLDG. NO.										CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/>										DRAWING NO.		SHT OF			
AIR COOLED DX COMPRESSOR										EQUIPMENT										ESTIMATOR		CHECKED BY			
SYS. NO.										MATERIAL										TOTAL		SHIPPING			
TASK DESCRIPTION										Unit Price Cost										Unit Wt		Total Wt			
Digital Output										43										\$43		\$99			
Analog Output																									
Digital Input										41										\$41		\$91			
Analog Input																									
TOTAL THIS SHEET																				\$105		\$85		\$190	

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY LOCATION FT. LEONARD WOOD, MISSOURI BLDG. NO. 4052										INVITATION NO./CONTRACT NO. DACA41-92-C-0098 CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER <input type="checkbox"/>				EFFECTIVE PRICING MARCH 1993 DRAWING NO.		DATE PREPARED 27-Mar-93 SHT OF	
ELECTRIC DW HEATER SYS. NO. DHW-1 TASK DESCRIPTION H/O/A & Control Relay										ESTIMATOR		KC TOTAL		CHECKED BY CEL			
Quantity No. Of Units 1 EA										LABOR MH/ Unit 3 Total Hrs 2.9		EQUIPMENT Unit Price 26 Cost \$75		MATERIAL Unit Price 77 Cost \$77		SHIPPING Unit Wt \$152	
Digital Output																	
Analog Output																	
Digital Input										1 EA 2 1.9 26 \$49		41 \$41 \$91					
Analog Input																	
TOTAL THIS SHEET												\$124		\$118		\$242	

COST ESTIMATE
BUILDING 4100 & 4101

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY LOCATION FT. LEONARD WOOD, MISSOURI BLDG. NO. 4100										INVITATION NO./CONTRACT NO. DACA41-92-C-0098 CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER <input type="checkbox"/>				EFFECTIVE PRICING MARCH 1993 DRAWING NO.		DATE PREPARED 27-Mar-93 SHT OF	
PERIMETER RADIATION SYS. NO. HWR-1		Quantity No. Of Units		LABOR MH/ Unit Total Hrs		EQUIPMENT Unit Price Cost		MATERIAL Unit Price Cost		ESTIMATOR KC TOTAL		CHECKED BY CEL SHIPPING Unit Wt					
TASK DESCRIPTION		1 EA 1 EA		3 3.1 4 3.6		26 26		295 415		\$295 \$415		\$376 \$508					
Analog Output CPA (Valve) ACU (Fan Coil)																	
Digital Output																	
Digital Input																	
Analog Input Temp. Space		2 EA		3 5.3		26		174		\$348		\$483					
TOTAL THIS SHEET										\$1,058		\$1,367					

COST ESTIMATE ANALYSIS

PROJECT										INVITATION NO./CONTRACT NO.										EFFECTIVE PRICING		DATE PREPARED																					
EMCS FEASIBILITY STUDY										DACA41-92-C-0098										MARCH 1993		27-Mar-93																					
LOCATION FT. LEONARD WOOD, MISSOURI										<input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER										DRAWING NO.		SHT OF																					
BLDG. NO. 4100																				ESTIMATOR		CHECKED BY																					
PERIMETER RADIATION										LABOR										MATERIAL										TOTAL		SHIPPING											
SYS. NO. HWR-2										MH/ Unit										Unit Price										Unit Price		Unit Price											
TASK DESCRIPTION										Total Hrs										Cost										Cost		Cost											
Digital Output																																											
Analog Output										1 EA										3 3.1										28										295		\$376	
ACU (Fan Coil)										1 EA										4 3.6										26										415		\$508	
Digital Input																																											
Analog Input										2 EA										3 5.3										26										174		\$483	
Temp. Space																																											
TOTAL THIS SHEET																																								\$1,058		\$1,367	

COST ESTIMATE
BUILDING 4102 & 4104

COST ESTIMATE ANALYSIS

COST ESTIMATE ANALYSIS														INVITATION NO./CONTRACT NO.				EFFECTIVE PRICING		DATE PREPARED	
PROJECT EMCS FEASIBILITY STUDY				DACA41-92-C-0098										MARCH 1993		27-Mar-93					
LOCATION FT. LEONARD WOOD, MISSOURI				CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/>										DRAWING NO.		SHT OF					
BLDG. NO. 4102				OTHER <input type="checkbox"/>										ESTIMATOR		CHECKED BY					
PERIMETER RADIATION				Quantity			LABOR			EQUIPMENT		MATERIAL		TOTAL		SHIPPING					
SYS. NO.	HWR-1	TASK DESCRIPTION	No. Of Units	Unit Meas	MH/ Unit	Total Hrs	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost	Unit Wt	Total Wt					
Digital Output																					
Analog Output			1	EA	3	3.1	26	\$81			295	\$295		\$376							
ACU (Fan Coll)			1	EA	4	3.6	26	\$93			415	\$415		\$508							
Digital Input																					
Analog Input			2	EA	3	5.3	26	\$135			174	\$348		\$483							
TOTAL THIS SHEET								\$309				\$1,058		\$1,367							

DA FORM 5416-R, APR 85

COST ESTIMATE ANALYSIS

[illegible]

COST ESTIMATE

BUILDING 4103

COST ESTIMATE ANALYSIS

INVITATION NO./CONTRACT NO.										EFFECTIVE PRICING		DATE PREPARED	
DACA41-92-C-0098										MARCH 1993		27 - Mar - 93	
<div> <div>CODE A <input checked="" type="checkbox"/></div> <div>CODE B <input type="checkbox"/></div> <div>CODE C <input type="checkbox"/></div> </div> <div>OTHER <input type="checkbox"/></div>										DRAWING NO.		SHT OF	
ESTIMATOR										KC		CHECKED BY	
CELESTIAL										SHIPPING		CEL	
MATERIAL										TOTAL		Unit	
Unit Price										Cost		Wt	
Total										Wt		Total	
PERIMETER RADIATION													
SYS. NO. HWR-2													
LOCATION FT. LEONARD WOOD, MISSOURI													
BLDG. NO. 4103													
TASK DESCRIPTION													
Digital Output													
CPA (Valve)													
ACU (Fan Coil)													
Digital Input													
Analog Input													
Temp. Space													
TOTAL THIS SHEET													

COST ESTIMATE ANALYSIS

PROJECT										INVITATION NO./CONTRACT NO.				EFFECTIVE PRICING		DATE PREPARED					
EMCS FEASIBILITY STUDY										DACA41-92-C-0098				MARCH 1993		27-Mar-93					
LOCATION FT. LEONARD WOOD, MISSOURI										CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/>				DRAWING NO.		SHT OF					
BLDG. NO. 4103										OTHER <input type="checkbox"/>				ESTIMATOR		CHECKED BY					
HOT WATER BOILER										LABOR				MATERIAL				TOTAL			
SYS. NO. BLR-1										MH/ Unit				Unit Price				Unit Wt			
TASK DESCRIPTION										Total Hrs				Cost				Total Wt			
Digital Output										1	EA	2	2.2	26	\$56			43	\$43	\$99	
Analog Output										1	EA	4	4.1	26	\$106		295	\$295	\$402		
Digital Input																					
Pressure Switch (Elec)												2		26			52				
Pressure Switch (Plum)										1	EA	2	1.9	24	\$47		51	\$51	\$97		
Auxiliary Contact										1	EA	2	1.9	26	\$49		43	\$43	\$92		
Status Relay										1	EA	2	1.9	26	\$49		41	\$41	\$91		
Analog Input										1	EA										
Temp. Water (Elec)										2	EA	3	6.3	26	\$161		222	\$444	\$605		
Temp. Water (Plum)										2	EA	2	4.3	24	\$104		65	\$130	\$234		
TOTAL THIS SHEET															\$572			\$1,048	\$1,620		

COST ESTIMATE

BUILDING 4109

COST ESTIMATE ANALYSIS

INVESTMENT NO./CONTRACT NO.										EFFECTIVE PRICING		DATE PREPARED	
DACA41-92-C-0088										MARCH 1993		27-Mar-93	
<div> <div>CODE A <input checked="" type="checkbox"/></div> <div>CODE B <input type="checkbox"/></div> <div>CODE C <input type="checkbox"/></div> <div>OTHER <input type="checkbox"/></div> </div>										DRAWING NO.		SHT OF	
ESTIMATOR										KC		CHECKED BY CEL	
MATERIAL										TOTAL		SHIPPING	
Unit Price										Cost		Unit Wt	
SINGLE ZONE & VAV AHU SYS. NO. ACU-1 TASK DESCRIPTION Digital Output Control Relay H/O/A & Control Relay										43	\$43	\$99	
Analog Output CPA (Damper) CPA (Valve)										295	\$295	\$376	
Digital Input Diff. Pressure Sw. (Fan) Diff. Pressure Sw. (Filter) End Position Switch										71	\$71	\$159	
Analog Input Temp. Space Temp. Avg. Duct Position Temp. Duct										174	\$348	\$483	
TOTAL THIS SHEET											\$2,169	\$3,113	

COST ESTIMATE ANALYSIS

INVITATION NO./CONTRACT NO.										EFFECTIVE PRICING		DATE PREPARED	
DACA41-92-C-0098										MARCH 1993		27-Mar-93	
<div> <div>CODE A <input checked="" type="checkbox"/></div> <div>CODE B <input type="checkbox"/></div> <div>CODE C <input type="checkbox"/></div> </div> <div>OTHER</div>										DRAWING NO.		SHT OF	
ESTIMATOR										KC		CHECKED BY CEL	
MATERIAL										TOTAL		SHIPPING	
Unit Price										Unit		Wt	
Cost										Cost		Wt	
SINGLE ZONE & VAV AHU SYS. NO. ACU-3 TASK DESCRIPTION Digital Output Control Relay H/O/A & Control Relay										43	\$43	\$99	
Analog Output CPA (Damper) CPA (Valve)										295	\$295	\$376	
Digital Input Diff. Pressure Sw. (Fan) Diff. Pressure Sw. (Filter) End Position Switch										71	\$71	\$159	
Analog Input Temp. Space Temp. Avg. Duct Position Temp. Duct										174	\$348	\$483	
TOTAL THIS SHEET											\$2,169	\$3,113	

COST ESTIMATE ANALYSIS

COST ESTIMATE ANALYSIS										INVITATION NO./CONTRACT NO. DACA41-92-C-0096				EFFECTIVE PRICING MARCH 1993		DATE PREPARED 27 - Mar - 93	
PROJECT EMCS FEASIBILITY STUDY		LOCATION FT. LEONARD WOOD, MISSOURI		BLDG. NO. 4109		CODE A <input type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/>		OTHER <input type="checkbox"/>		DRAWING NO.		SHT OF		CHECKED BY CEL			
HOT WATER BOILER		LABOR		EQUIPMENT		MATERIAL		TOTAL		ESTIMATOR		KC		SHIPPING			
SYS. NO.		Quantity		Unit		Unit Price		Unit Price		Unit Price		Unit Price		Unit Price			
TASK DESCRIPTION		No. Of Units		MH/ Unit		Total Hrs		Cost		Cost		Cost		Cost			
Digital Output		1 EA		2		2.2		\$58		43		\$99					
Analog Output		1 EA		4		4.1		\$108		295		\$402					
Digital Input		1 EA		2		26				52							
Pressure Switch (Elec)		1 EA		2		1.9		\$47		51		\$97					
Auxiliary Contact		1 EA		2		1.9		\$49		43		\$92					
Status Relay		1 EA		2		1.9		\$49		41		\$91					
Analog Input		2 EA		3		6.3		\$161		222		\$605					
Temp. Water (Elec)		2 EA		2		4.3		\$104		65		\$234					
TOTAL THIS SHEET								\$572				\$1,048		\$1,620			

COST ESTIMATE

**BUILDING 4110
AND TYPICAL FOR
4111, 4112, 4113, 4114, AND 4115**

COST ESTIMATE ANALYSIS

[illegible]

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY										INVITATION NO./CONTRACT NO.				EFFECTIVE PRICING		DATE PREPARED											
LOCATION FT. LEONARD WOOD, MISSOURI										DACA41-92-C-0098				MARCH 1983		27-Mar-83											
BLDG. NO. 4110										<input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER				DRAWING NO.		SHT OF											
PERIMETER RADIATION										LABOR				EQUIPMENT		MATERIAL		ESTIMATOR		KC		CHECKED BY		CEL			
SYS. NO. HWR-2										Quantity				Total				SHIPPING									
TASK DESCRIPTION										No. Of Units		MH/ Unit		Total Hrs		Unit Price		Cost		Unit Price		Cost		Unit Price		Total Wt	
Digital Output																											
Analog Output										1 EA		3		3.1		26		\$81		295		\$295		\$376			
ACU (Fan Coil)										1 EA		4		3.6		26		\$93		415		\$415		\$508			
Digital Input																											
Analog Input										2 EA		3		5.3		26		\$135		174		\$348		\$483			
Temp. Space																											
TOTAL THIS SHEET																		\$309				\$1,058		\$1,367			

COST ESTIMATE ANALYSIS

COST ESTIMATE ANALYSIS										INVITATION NO./CONTRACT NO.				EFFECTIVE PRICING		DATE PREPARED	
PROJECT		EMCS FEASIBILITY STUDY		DACA41-92-C-0098						MARCH 1993		27-Mar-93					
LOCATION		FT. LEONARD WOOD, MISSOURI		<input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER						DRAWING NO.		SHT OF					
BLDG. NO.		4110		LABOR		EQUIPMENT		MATERIAL		ESTIMATOR		CHECKED BY					
SYS. NO.		BLR-1		Quantity		Unit		Unit		Unit		SHIPPING					
TASK DESCRIPTION		No. Of Units	MH/ Unit	Total Hrs	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost	Unit	Wt	Total Wt				
Digital Output	Control Relay	1	EA	2	2.2	26					43		\$89				
Analog Output	CPA (Electric)	1	EA	4	4.1	26		\$108			295		\$402				
Digital Input	Pressure Switch (Elec)			2		26					52						
	Pressure Switch (Plum)	1	EA	2	1.9	24		\$47			51		\$97				
	Auxiliary Contact	1	EA	2	1.9	26		\$49			43		\$92				
	Status Relay	1	EA	2	1.9	26		\$49			41		\$91				
Analog Input	Temp. Water (Elec)	2	EA	3	6.3	26		\$161			222		\$605				
	Temp. Water (Plum)	2	EA	2	4.3	24		\$104			65		\$234				
TOTAL THIS SHEET								\$572					\$1,048				
													\$1,620				

PAGE

DA FORM 5416-R, APR 85

COST ESTIMATE

BUILDING 5001

COST ESTIMATE ANALYSIS

[illegible]

COST ESTIMATE

BUILDING 5002

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY										INVITATION NO./CONTRACT NO.				EFFECTIVE PRICING		DATE PREPARED	
LOCATION FT. LEONARD WOOD, MISSOURI										DACA41-92-C-0088				MARCH 1993		27-Mar-93	
BLDG. NO. 5002										<input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER				DRAWING NO.		SHT OF	
AHU										ESTIMATOR				KC		CHECKED BY CEL	
SYS. NO. AHU-1										MATERIAL				TOTAL		SHIPPING	
TASK DESCRIPTION										Unit Price				Unit Wt		Unit Wt	
Digital Output										43				\$43		\$99	
Analog Output										295				\$295		\$376	
Digital Input										71				\$71		\$159	
Analog Input										174				\$348		\$483	
TOTAL THIS SHEET										\$380				\$757		\$1,117	

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY										INVITATION NO./CONTRACT NO.				EFFECTIVE PRICING		DATE PREPARED	
LOCATION FT. LEONARD WOOD, MISSOURI										DACA41-92-C-0098				MARCH 1993		27-Mar-93	
BLDG. NO. 5002										<input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER				DRAWING NO.		SHT OF	
AHU										ESTIMATOR		KC		CHECKED BY CEL			
SYS. NO. AHU-2										LABOR		EQUIPMENT		MATERIAL		TOTAL	
TASK DESCRIPTION										Total Hrs		Unit Price		Unit Price		Unit Price	
Digital Output										1 EA		2 2.2		26		43	
Analog Output										1 EA		3 3.1		26		295	
Digital Input										1 EA		3 3.4		26		71	
Analog Input										2 EA		3 5.3		26		174	
Temp. Space																	
TOTAL THIS SHEET																\$1,117	

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY										INVITATION NO./CONTRACT NO.										EFFECTIVE PRICING		DATE PREPARED			
LOCATION FT. LEONARD WOOD, MISSOURI										DAC441-92-C-0098										MARCH 1993		27-Mar-93			
BLDG. NO. 5002										<input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER										DRAWING NO.		SHT OF			
AIR COOLED DX COMPRESSOR										ESTIMATOR										KC		CHECKED BY CEL			
SYS. NO. ACCU-1										LABOR										MATERIAL		SHIPPING			
TASK DESCRIPTION										Quantity No. Of Units Unit Meas MH/ Unit Total Hrs Unit Price Cost Unit Price Cost Unit Price Total										Unit Wt Total Wt					
Digital Output										1 EA 2 2.2 26 \$56 43 \$43 \$99															
Analog Output																									
Digital Input										1 EA 2 1.9 26 \$49 41 \$41 \$91															
Analog Input																									
TOTAL THIS SHEET																				\$105		\$95		\$190	

COST ESTIMATE ANALYSIS										INVITATION NO./CONTRACT NO.			EFFECTIVE PRICING		DATE PREPARED	
PROJECT EMCS FEASIBILITY STUDY										DACA41-92-C-0098			MARCH 1993		27-Mar-93	
LOCATION FT. LEONARD WOOD, MISSOURI										CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/>			DRAWING NO.		SHT OF	
BLDG. NO. 5002										OTHER <input type="checkbox"/>			ESTIMATOR		CHECKED BY	
AIR COOLED DX COMPRESSOR										EQUIPMENT			MATERIAL		TOTAL	
SYS. NO. ACCU-2										Unit Price			Unit Price		Unit Wt	
TASK DESCRIPTION										Cost			Cost		Total Wt	
Digital Output										Control Relay			43		\$90	
Analog Output																
Digital Input										Status Relay			41		\$91	
Analog Input																
TOTAL THIS SHEET															\$190	

COST ESTIMATE

BUILDING 5004

COST ESTIMATE ANALYSIS

[illegible]

COST ESTIMATE

BUILDING 5007

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY										INVITATION NO./CONTRACT NO.										EFFECTIVE PRICING		DATE PREPARED	
LOCATION FT. LEONARD WOOD, MISSOURI										DACA41-92-C-0098										MARCH 1993		29-Mar-93	
BLDG. NO. 5007										<input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER										DRAWING NO.		SHT OF	
UNIT HEATER										ESTIMATOR										KC		CHECKED BY CEL	
SYS. NO. UH-1										MATERIAL										TOTAL		SHIPPING	
TASK DESCRIPTION										Unit Price										Cost		Unit Wt	
Digital Output										43										\$43		\$99	
Analog Output																							
Digital Input										43										\$43		\$92	
Analog Input																							
Temp. Space										174										\$174		\$242	
TOTAL THIS SHEET																				\$260		\$433	

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY LOCATION FT. LEONARD WOOD, MISSOURI BLDG. NO. 5007										INVITATION NO./CONTRACT NO. DACA41-92-C-0098 <input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER				EFFECTIVE PRICING MARCH 1993 DRAWING NO.		DATE PREPARED 29-Mar-93 SHT OF			
UNIT HEATER SYS. NO. UH-5 TASK DESCRIPTION Control Relay										ESTIMATOR		KC		CHECKED BY		CEL			
Quantity No. Of Units 1 EA										LABOR MH/ Unit 2 Total Hrs 2.2		EQUIPMENT Unit Price 26		MATERIAL Unit Price 43		TOTAL Cost \$56		SHIPPING Unit Wt \$99	
Digital Output																			
Analog Output																			
Digital Input																			
Auxiliary Contact																			
Analog Input																			
Temp. Space																			
TOTAL THIS SHEET																			

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY										INVITATION NO./CONTRACT NO.				EFFECTIVE PRICING		DATE PREPARED	
LOCATION FT. LEONARD WOOD, MISSOURI										DACA41-92-C-0098				MARCH 1993		29-Mar-93	
BLDG. NO. 5007										<input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER				DRAWING NO.		SHT OF	
UNIT HEATER		Quantity		LABOR		EQUIPMENT		MATERIAL		ESTIMATOR		KC		CHECKED BY		CEL	
SYS. NO.	UH-6	No. Of	Unit	MH/	Total	Unit	Price	Unit	Price	Unit	Price	Unit	Price	Unit	Price	Unit	Price
TASK DESCRIPTION		Units	Meas	Unit	Hrs	Price	Cost	Unit	Price	Unit	Price	Unit	Price	Unit	Price	Unit	Price
Digital Output		1	EA	2	2.2	26	\$56			43	\$43						
Analog Output																	
Digital Input		1	EA	2	1.9	26	\$49			43	\$43						
Analog Input																	
Temp. Space		1	EA	3	2.6	26	\$68			174	\$174						
TOTAL THIS SHEET							\$173									\$280	\$433

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY LOCATION FT. LEONARD WOOD, MISSOURI BLDG. NO. 5007										INVITATION NO./CONTRACT NO. DACA41-92-C-0098 <input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER				EFFECTIVE PRICING MARCH 1993 DRAWING NO.		DATE PREPARED 29-Mar-93 SHT OF	
UNIT HEATER SYS. NO. UH-9		Quantity No. Of Units		LABOR MH/ Unit Total Hrs		EQUIPMENT Unit Price Cost		MATERIAL Unit Price Cost		ESTIMATOR KC TOTAL		CHECKED BY CEL SHIPPING					
TASK DESCRIPTION Digital Output Control Relay		1 EA		2 2.2		26 \$58		43 \$43		\$99							
Analog Output																	
Digital Input		1 EA		2 1.9		26 \$49		43 \$43		\$92							
Analog Input		1 EA		3 2.6		26 \$68		174 \$174		\$242							
Temp. Space																	
TOTAL THIS SHEET						\$173				\$260		\$433					

COST ESTIMATE ANALYSIS

[illegible]

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY LOCATION FT. LEONARD WOOD, MISSOURI BLDG. NO. 5007										INVITATION NO./CONTRACT NO. DACA41-92-C-0098 CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER <input type="checkbox"/>				EFFECTIVE PRICING MARCH 1993 DRAWING NO.		DATE PREPARED 29-Mar-93 SHT OF	
UNIT HEATER SYS. NO. UH-13 TASK DESCRIPTION Control Relay										ESTIMATOR		KC		CHECKED BY CEL			
Quantity No. Of Units 1 EA										LABOR MH/ Unit 2 Total Hrs 2.2		EQUIPMENT Unit Price 26 Cost \$56		MATERIAL Unit Price 43 Cost \$43		TOTAL Unit Wt \$99	
Digital Output																	
Analog Output																	
Digital Input																	
Auxiliary Contact																	
Temp. Space																	
TOTAL THIS SHEET																	

COST ESTIMATE

BUILDING 5265

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY LOCATION FT. LEONARD WOOD, MISSOURI BLDG. NO. 5285										INVITATION NO./CONTRACT NO. DACA41-92-C-0098 CODE A <input type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER <input type="checkbox"/>				EFFECTIVE PRICING MARCH 1993 DRAWING NO.		DATE PREPARED 29-Mar-93 SHT OF			
AHU SYS. NO. AC-B-1 TASK DESCRIPTION Digital Output Control Relay										LABOR MH/ Unit Total Hrs 2 2.2 26		EQUIPMENT Unit Price Cost		MATERIAL Unit Price Cost		ESTIMATOR KC TOTAL		CHECKED BY CEL SHIPPING Unit Wt	
Analog Output CPA (Valve)										1 EA 2 3.1 26		\$81		295 \$295 \$376		\$99			
Digital Input Diff. Pressure Sw. (Fan)										1 EA 3 3.4 26		\$88		71 \$71 \$159					
Analog Input Temp. Space										2 EA 3 5.3 26		\$135		174 \$348 \$483					
TOTAL THIS SHEET												\$360		\$757		\$1,117			

COST ESTIMATE ANALYSIS

COST ESTIMATE ANALYSIS										INVITATION NO./CONTRACT NO.						EFFECTIVE PRICING		DATE PREPARED	
PROJECT EMCS FEASIBILITY STUDY										DACA41-92-C-0098						MARCH 1993		29-Mar-93	
LOCATION FT. LEONARD WOOD, MISSOURI										CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/>						DRAWING NO.		SHT OF	
BLDG. NO. 5265										OTHER <input type="checkbox"/>									
AHU		Quantity		LABOR		EQUIPMENT		MATERIAL		ESTIMATOR		KC	CHECKED BY		CEL				
SYS. NO.	AC-B-2	No. Of Units	MH/ Unit	Total Hrs	Unit Price	Cost	Unit Price	Cost	Unit Price	TOTAL		SHIPPING	Unit	Wt	Total	Wt			
TASK DESCRIPTION																			
Digital Output	Control Relay	1	EA	2	2.2	26	\$56		43	\$99									
Analog Output	CPA (Valve)	1	EA	3	3.1	26	\$81		295	\$376									
Digital Input	Diff. Pressure Sw. (Fan)	1	EA	3	3.4	26	\$88		71	\$159									
Analog Input	Temp. Space	2	EA	3	5.3	26	\$135		174	\$483									
TOTAL THIS SHEET							\$360			\$757					\$1,117				

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY										INVITATION NO./CONTRACT NO.										EFFECTIVE PRICING		DATE PREPARED			
LOCATION FT. LEONARD WOOD, MISSOURI										DACA41-92-C-0098										MARCH 1993		29-Mar-93			
BLDG. NO. 5285										<input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER										DRAWING NO.		SHT OF			
SINGLE ZONE & VAV AHU										ESTIMATOR										KC		CHECKED BY		CEL	
SYS. NO. AC-D-2										LABOR										MATERIAL		TOTAL		SHIPPING	
TASK DESCRIPTION										Unit Price										Unit Price		Unit Price		Unit Price	
Digital Output										1 EA 2 2.2 26 26										43		\$43		\$99	
H/O/A & Control Relay										EA 3 26										77					
Analog Output										1 EA 3 3.1 26										295		\$295		\$378	
CPA (Damper)										2 EA 3 6.3 26										295		\$590		\$752	
CPA (Valve)																									
Digital Input										1 EA 3 3.4 26										71		\$71		\$159	
Diff. Pressure Sw. (Fan)										1 EA 3 3.4 26										71		\$71		\$159	
Diff. Pressure Sw. (Filter)										EA 2 26										69					
End Position Switch																									
Analog Input										2 EA 3 5.3 26										174		\$348		\$483	
Temp. Space										1 EA 4 3.6 26										190		\$190		\$283	
Temp. Avg. Duct										1 EA 3 3.1 26										191		\$191		\$271	
Position										2 EA 3 6.3 26										185		\$370		\$531	
Temp. Duct																									
TOTAL THIS SHEET																						\$2,189		\$3,113	

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY										INVITATION NO./CONTRACT NO.										EFFECTIVE PRICING		DATE PREPARED																																			
LOCATION FT. LEONARD WOOD, MISSOURI										DACA41-92-C-0098										MARCH 1993		29-Mar-93																																			
BLDG. NO. 5285										<input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER										DRAWING NO.		SHT OF																																			
SINGLE ZONE & VAV AHU										ESTIMATOR										KC		CHECKED BY		CEL																																	
SYS. NO. AC-G-1										LABOR										MATERIAL										TOTAL		SHIPPING																									
TASK DESCRIPTION										Unit Price										Unit Price										Cost		Total Wt																									
Digital Output										No. Of Units 1 EA 2 EA										MH/ Unit 2 3										Total Hrs 2.2 6.3										Unit Price 26 26										Cost \$56		Unit Price 43 77		Cost \$43		Total Wt \$99	
H/O/A & Control Relay																																																									
Analog Output										1 EA 2 EA										3 3										3.1 6.3										26 26										\$81 \$161							
CPA (Damper)																																																									
CPA (Valve)																																																									
Digital Input										1 EA 1 EA EA										3 3 2										3.4 3.4										26 26 26										\$88 \$88							
Diff. Pressure Sw. (Fan)																																																									
Diff. Pressure Sw. (Filter)																																																									
End Position Switch																																																									
Analog Input										2 EA 1 EA 1 EA 2 EA										3 4 3 3										5.3 3.6 3.1 6.3										26 26 26 26										\$135 \$93 \$81 \$161		174 190 191 185		\$348 \$190 \$191 \$370		\$483 \$283 \$271 \$531	
Temp. Space																																																									
Temp. Avg. Duct																																																									
Position																																																									
Temp. Duct																																																									
TOTAL THIS SHEET																																								\$944								\$2,169 \$3,113									

COST ESTIMATE ANALYSIS

[illegible]

COST ESTIMATE ANALYSIS

COST ESTIMATE ANALYSIS										INVITATION NO./CONTRACT NO.				EFFECTIVE PRICING		DATE PREPARED	
PROJECT		EMCS FEASIBILITY STUDY		LOCATION		FT. LEONARD WOOD, MISSOURI		BLDG. NO.		5265		DACA41-92-C-0098		MARCH 1993		29-Mar-93	
TASK DESCRIPTION		Quantity		LABOR		EQUIPMENT		MATERIAL		ESTIMATOR		KC		CHECKED BY		CEL	
SYS. NO.	AC-K-2	No. Of Units	Unit Meas	MH/ Unit	Total Hrs	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost
Digital Output	Control Relay	1	EA	2	2.2	26	\$56			43	\$43		\$99				
	H/O/A & Control Relay		EA	3		26				77							
Analog Output	CPA (Damper)	1	EA	3	3.1	26	\$81			295	\$295		\$376				
	CPA (Valve)	2	EA	3	6.3	26	\$161			295	\$590		\$752				
Digital Input	Diff. Pressure Sw. (Fan)	1	EA	3	3.4	26	\$88			71	\$71		\$159				
	Diff. Pressure Sw. (Filter)	1	EA	3	3.4	26	\$88			71	\$71		\$159				
	End Position Switch		EA	2		26				69							
Analog Input	Temp. Space	2	EA	3	5.3	26	\$135			174	\$348		\$483				
	Temp. Avg. Duct	1	EA	4	3.6	26	\$93			190	\$190		\$283				
	Position	1	EA	3	3.1	26	\$81			191	\$191		\$271				
	Temp. Duct	2	EA	3	6.3	26	\$161			185	\$370		\$531				
TOTAL THIS SHEET											\$944		\$2,169		\$3,113		

COST ESTIMATE ANALYSIS

COST ESTIMATE ANALYSIS														INVITATION NO./CONTRACT NO.				EFFECTIVE PRICING		DATE PREPARED	
PROJECT				EMCS FEASIBILITY STUDY				DACA41-82-C-0098				MARCH 1993		29-Mar-93							
LOCATION				FT. LEONARD WOOD, MISSOURI				<input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER				DRAWING NO.		SHT OF							
BLDG. NO. 5285												ESTIMATOR		CHECKED BY							
AHU				LABOR				EQUIPMENT		MATERIAL		TOTAL		SHIPPING							
SYS. NO.		HV-A-1		Quantity		MH/		Total		Unit		Unit		Unit							
				No. Of		Unit		Hrs		Price		Price		Wt							
TASK DESCRIPTION				Units		Meas		Cost		Cost		Cost		Total							
Digital Output		Control Relay		1	EA	2	2.2	26	\$56			43	\$43	\$99							
Analog Output		CPA (Valve)		1	EA	3	3.1	26	\$81			295	\$295	\$376							
Digital Input		Diff. Pressure Sw. (Fan)		1	EA	3	3.4	26	\$88			71	\$71	\$159							
Analog Input		Temp. Space		2	EA	3	5.3	26	\$135			174	\$348	\$483							
TOTAL THIS SHEET									\$360				\$757	\$1,117							

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COST ESTIMATE ANALYSIS

COST ESTIMATE ANALYSIS						INVITATION NO./CONTRACT NO.							EFFECTIVE PRICING		DATE PREPARED		
						DACA41-92-C-0098							MARCH 1993		29-Mar-93		
						CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/>							DRAWING NO.		SHT OF		
						OTHER _____							ESTIMATOR		CHECKED BY		
													KC		CEL		
													TOTAL		SHIPPING		
													Unit		Wt		
													Total		Wt		
PROJECT LOCATION BLDG. NO. AHU SYS. NO.	EMCS FEASIBILITY STUDY					Quantity		LABOR		EQUIPMENT		MATERIAL		ESTIMATOR		KC	
	FT. LEONARD WOOD, MISSOURI					No. Of Units	Unit Meas	MH/ Unit	Total Hrs	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost		
	3265					1	EA	2	2.2	26	\$56			43	\$43	\$99	
	TASK DESCRIPTION																
	Control Relay																
Analog Output	HV-C-1																
	CPA (Valve)					1	EA	3	3.1	26	\$81			295	\$295	\$376	
Digital Input	Diff. Pressure Sw. (Fan)					1	EA	3	3.4	26	\$88			71	\$71	\$159	
Analog Input	Temp. Space					2	EA	3	5.3	26	\$135			174	\$348	\$483	
TOTAL THIS SHEET											\$360				\$757	\$1,117	

PAGE

DA FORM 5416-R, APR 85

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY										INVITATION NO./CONTRACT NO. DACA41-92-C-0098				EFFECTIVE PRICING MARCH 1993		DATE PREPARED 29-Mar-93	
LOCATION FT. LEONARD WOOD, MISSOURI										CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/>				DRAWING NO.		SHT OF	
BLDG. NO. 5265										OTHER <input type="checkbox"/>				ESTIMATOR		CHECKED BY	
AHU										LABOR				MATERIAL		SHIPPING	
SYS. NO.		HV-D-1		MH/		Total		Unit		Unit		Unit		Unit		Total	
				Unit		Hrs		Price		Cost		Price		Cost		Wt	
TASK DESCRIPTION		Control Relay		1		EA		2		2.2		26		43		\$99	
Digital Output																	
Analog Output		CPA (Valve)		1		EA		3		3.1		26		295		\$376	
Digital Input		Diff. Pressure Sw. (Fan)		1		EA		3		3.4		26		71		\$159	
Analog Input		Temp. Space		2		EA		3		5.3		26		174		\$483	
TOTAL THIS SHEET																\$1,117	

COST ESTIMATE ANALYSIS

COST ESTIMATE ANALYSIS										INVITATION NO./CONTRACT NO.				EFFECTIVE PRICING		DATE PREPARED	
PROJECT		EMCS FEASIBILITY STUDY		DACA41-92-C-0098						MARCH 1993		29-Mar-93					
LOCATION		FT. LEONARD WOOD, MISSOURI		CODE A <input type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/>						DRAWING NO.		SHT OF					
BLDG. NO.		5265		OTHER <input type="checkbox"/>								CHECKED BY					
SINGLE ZONE & VAV AHU				Quantity		LABOR		EQUIPMENT		MATERIAL		TOTAL		SHIPPING			
SYS. NO.	HV-D-3	No. Of Units	Unit Meas	MH/ Unit	Total Hrs	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost	Unit	Total Wt	Unit	Total Wt		
TASK DESCRIPTION																	
Digital Output	Control Relay	1	EA	2	2.2	26	\$56					43			\$99		
	H/O/A & Control Relay		EA	3		26						77					
Analog Output																	
	CPA (Damper)	1	EA	3	3.1	26	\$81					295			\$376		
	CPA (Valve)	2	EA	3	6.3	26	\$161					295			\$752		
Digital Input																	
	Diff. Pressure Sw. (Fan)	1	EA	3	3.4	26	\$88					71			\$159		
	Diff. Pressure Sw. (Filter)	1	EA	3	3.4	26	\$88					71			\$159		
	End Position Switch		EA	2		26						69					
Analog Input																	
	Temp. Space	2	EA	3	5.3	26	\$135					174			\$483		
	Temp. Avg. Duct	1	EA	4	3.6	26	\$93					190			\$283		
	Position	1	EA	3	3.1	26	\$81					191			\$271		
	Temp. Duct	2	EA	3	6.3	26	\$161					185			\$531		
TOTAL THIS SHEET																	
PAGE																	

COST ESTIMATE ANALYSIS

INVITATION NO./CONTRACT NO.

EFFECTIVE PRICING

DATE PREPARED

DACA41-92-C-0098

MARCH 1993

29-Mar-93

PROJECT	EMCS FEASIBILITY STUDY
1.0	1.0
2.0	2.0
3.0	3.0
4.0	4.0
5.0	5.0
6.0	6.0
7.0	7.0
8.0	8.0
9.0	9.0
10.0	10.0
11.0	11.0
12.0	12.0
13.0	13.0
14.0	14.0
15.0	15.0
16.0	16.0
17.0	17.0
18.0	18.0
19.0	19.0
20.0	20.0
21.0	21.0
22.0	22.0
23.0	23.0
24.0	24.0
25.0	25.0
26.0	26.0
27.0	27.0
28.0	28.0
29.0	29.0
30.0	30.0
31.0	31.0
32.0	32.0
33.0	33.0
34.0	34.0
35.0	35.0
36.0	36.0
37.0	37.0
38.0	38.0
39.0	39.0
40.0	40.0
41.0	41.0
42.0	42.0
43.0	43.0
44.0	44.0
45.0	45.0
46.0	46.0
47.0	47.0
48.0	48.0
49.0	49.0
50.0	50.0
51.0	51.0
52.0	52.0
53.0	53.0
54.0	54.0
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69.0	69.0
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75.0	75.0
76.0	76.0
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86.0	86.0
87.0	87.0
88.0	88.0
89.0	89.0
90.0	90.0
91.0	91.0
92.0	92.0
93.0	93.0
94.0	94.0
95.0	95.0
96.0	96.0
97.0	97.0
98.0	98.0
99.0	99.0
100.0	100.0

PROJECT EMCS FEASIBILITY STUDY

PROJECT	EMCS FEASIBILITY STUDY
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CODE A	X	CODE B	CODE C

DRAWING NO.

SHT OF

LOCATION **FT. LEONARD WOOD, MISSOURI**

LOCATION	FT. LEONARD WOOD, MISSOURI
<p>1. <i>Staphylinidae</i> (100%)</p> <p>2. <i>Curculionidae</i> (100%)</p> <p>3. <i>Chrysomelidae</i> (100%)</p> <p>4. <i>Scarabaeidae</i> (100%)</p> <p>5. <i>Elmidae</i> (100%)</p> <p>6. <i>Colletidae</i> (100%)</p> <p>7. <i>Formicidae</i> (100%)</p> <p>8. <i>Psocidae</i> (100%)</p> <p>9. <i>Dermaptera</i> (100%)</p> <p>10. <i>Orthoptera</i> (100%)</p> <p>11. <i>Lepidoptera</i> (100%)</p> <p>12. <i>Diptera</i> (100%)</p> <p>13. <i>Hymenoptera</i> (100%)</p> <p>14. <i>Neuroptera</i> (100%)</p> <p>15. <i>Trichoptera</i> (100%)</p> <p>16. <i>Phlebotominae</i> (100%)</p> <p>17. <i>Culicidae</i> (100%)</p> <p>18. <i>Simuliidae</i> (100%)</p> <p>19. <i>Tabanidae</i> (100%)</p> <p>20. <i>Musculidae</i> (100%)</p> <p>21. <i>Cecidomyiidae</i> (100%)</p> <p>22. <i>Chironomidae</i> (100%)</p> <p>23. <i>Trichoptera</i> (100%)</p> <p>24. <i>Phlebotominae</i> (100%)</p> <p>25. <i>Culicidae</i> (100%)</p> <p>26. <i>Simuliidae</i> (100%)</p> <p>27. <i>Tabanidae</i> (100%)</p> <p>28. <i>Musculidae</i> (100%)</p> <p>29. <i>Cecidomyiidae</i> (100%)</p> <p>30. <i>Chironomidae</i> (100%)</p>	

OTHER _____

BLDG. NO. 5285

BLDG. NO.	5265
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ESTIMATOR

CHECKED BY

SINGLE ZONE & VAV AHU		Qual
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
6	6	6
7	7	7
8	8	8
9	9	9
10	10	10
11	11	11
12	12	12
13	13	13
14	14	14
15	15	15
16	16	16
17	17	17
18	18	18
19	19	19
20	20	20
21	21	21
22	22	22
23	23	23
24	24	24
25	25	25
26	26	26
27	27	27
28	28	28
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31	31	31
32	32	32
33	33	33
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35	35	35
36	36	36
37	37	37
38	38	38
39	39	39
40	40	40
41	41	41
42	42	42
43	43	43
44	44	44
45	45	45
46	46	46
47	47	47
48	48	48
49	49	49
50	50	50
51	51	51
52	52	52
53	53	53
54	54	54
55	55	55
56	56	56
57	57	57
58	58	58
59	59	59
60	60	60
61	61	61
62	62	62
63	63	63
64	64	64
65	65	65
66	66	66
67	67	67
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69	69	69
70	70	70
71	71	71
72	72	72
73	73	73
74	74	74
75	75	75
76	76	76
77	77	77
78	78	78
79	79	79
80	80	80
81	81	81
82	82	82
83	83	83
84	84	84
85	85	85
86	86	86
87	87	87
88	88	88
89	89	89
90	90	90
91	91	91
92	92	92
93	93	93
94	94	94
95	95	95
96	96	96
97	97	97
98	98	98
99	99	99
100	100	100

SINGLE ZONE & VAV AHU	LABOR					
	Quantity					
	A-09	B-08	C-07	D-06	E-05	F-04

	EQUIPMENT	
	11-14	

<div style="display: flex; justify-content: space-between;"> <div> <p> 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 </p> </div> <div> <p> 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 </p> </div> </div>	<div style="display: flex; justify-content: space-between;"> <div> <p> 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 </p> </div> <div> <p> 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184</</p></div></div>
---	---

SHIPPIN

SYS. NO.	HW-D-4	No. Of
TASK DESCRIPTION		Units

[illegible]

Unit	Price	Cost
------	-------	------

Cost

WT 311

TASK DESCRIPTION		UNITS
Digital Output	Control Relay	1

TASK DESCRIPTION		UNIT	MEAS	UNIT	MEAS
Digital Output	Control Relay	1	EA	2	22
					28

	\$58
--	------

	\$43
--	-------------

Digital Output	Control Relay
	H/O/A & Control Relay

Original Output	Control Relay	EA	3	26
	H/O/A & Control Relay	EA	3	26

1000 JOURNAL OF CLIMATE

Figure 1: A schematic diagram of a rectangular domain with a central horizontal strip. The domain is divided into three horizontal regions. The top and bottom regions are labeled 'A' and the middle region is labeled 'B'. The central strip is labeled 'B' and contains a smaller rectangular region labeled 'A'. The diagram is labeled 'Figure 1' at the bottom.

[illegible]

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COST ESTIMATE ANALYSIS

INVOITATION NO./CONTRACT NO.										EFFECTIVE PRICING		DATE PREPARED	
DACA41-92-C-0098										MARCH 1993		29-Mar-93	
<div> <div>CODE A <input checked="" type="checkbox"/></div> <div>CODE B <input type="checkbox"/></div> <div>CODE C <input type="checkbox"/></div> <div>OTHER <input type="checkbox"/></div> </div>										DRAWING NO.		SHT OF	
ESTIMATOR										KC		CHECKED BY CEL	
MATERIAL										TOTAL		SHIPPING	
Unit Price										Cost		Unit Wt	
Total Wt													
SINGLE ZONE & VAV AHU SYS. NO. HV-G-5 TASK DESCRIPTION Control Relay H/O/A & Control Relay										43	\$43	\$99	
Analog Output CPA (Damper) CPA (Valve)										295	\$295	\$378	
Digital Input Diff. Pressure Sw. (Fan) Diff. Pressure Sw. (Filter) End Position Switch										71	\$71	\$159	
Analog Input Temp. Space Temp. Avg. Duct Position Temp. Duct										174	\$348	\$483	
TOTAL THIS SHEET											\$2,169	\$3,113	

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY										INVITATION NO./CONTRACT NO.				EFFECTIVE PRICING		DATE PREPARED	
LOCATION FT. LEONARD WOOD, MISSOURI										DACA41-92-C-0098				MARCH 1993		29-Mar-93	
BLDG. NO. 5285										<input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER				DRAWING NO.		SHT OF	
AHU		Quantity		LABOR		EQUIPMENT		MATERIAL		ESTIMATOR		KC		CHECKED BY		CEL	
SYS. NO.	HV-K-1	No. Of	Unit	MH/	Total	Unit	Price	Cost	Unit	Price	Cost	Unit	Price	Cost	Unit	Price	Cost
TASK DESCRIPTION		Units	Meas	Unit	Hrs	Price			Price			Price			Price		
Digital Output		1	EA	2	2.2	26		\$56		43	\$43			\$99			
Analog Output		1	EA	3	3.1	26		\$81		295	\$295			\$376			
Digital Input		1	EA	3	3.4	26		\$86		71	\$71			\$159			
Analog Input		2	EA	3	5.3	26		\$135		174	\$348			\$483			
Temp. Space																	
TOTAL THIS SHEET								\$360			\$757			\$1,117			

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY LOCATION FT. LEONARD WOOD, MISSOURI BLDG. NO. 5265										INVITATION NO./CONTRACT NO. DACA41-92-C-0098 CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER _____				EFFECTIVE PRICING MARCH 1993 DRAWING NO. _____		DATE PREPARED 29-Mar-93 SHT OF					
FAN COIL SYS. NO. FC-1 TASK DESCRIPTION Control Relay										LABOR MH/ Unit Total Hrs 2.2 2		EQUIPMENT Unit Price Cost \$56		MATERIAL Unit Price Cost 43		ESTIMATOR TOTAL \$43		KC TOTAL \$99		CHECKED BY CEL SHIPPING Unit Wt	
Digital Output ACU (Fan Coil)										1 EA 1 2.2 2		26 26 \$56		415 \$415		\$508					
Digital Input																					
Analog Input																					
Temp. Space (RTD Only)										1 EA 3 2.6		26 \$68		50 \$50		\$117					
TOTAL THIS SHEET												\$217		\$508		\$725					

COST ESTIMATE ANALYSIS

COST ESTIMATE ANALYSIS								INVITATION NO./CONTRACT NO.						EFFECTIVE PRICING		DATE PREPARED	
PROJECT EMCS FEASIBILITY STUDY LOCATION FT. LEONARD WOOD, MISSOURI BLDG. NO. 5265				DACA41-92-C-0098				MARCH 1993		29-Mar-93							
				CODE A X CODE B		CODE C		DRAWING NO.		SHT OF							
FAN COIL				LABOR		EQUIPMENT		MATERIAL		ESTIMATOR		KC	CHECKED BY	CEL			
SYS. NO.	FC-2	No. Of Units	MH/ Unit	Total Hrs	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost	TOTAL	SHIPPING	Unit	Total Wt			
TASK DESCRIPTION			Meas										Wt				
Digital Output	Control Relay	1 EA	2	2.2	26	\$56	43	\$43			\$99						
Analog Output	ACU (Fan Coil)	1 EA	4	3.6	26	\$93	415	\$415			\$508						
Digital Input																	
Analog Input	Temp. Space (RTD Only)	1 EA	3	2.6	26	\$68	50	\$50			\$117						
TOTAL THIS SHEET												\$217	\$508	\$725			

COST ESTIMATE ANALYSIS

[illegible]

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY										INVOITATION NO./CONTRACT NO.										EFFECTIVE PRICING				DATE PREPARED													
LOCATION FT. LEONARD WOOD, MISSOURI										DACA41-92-C-0098										MARCH 1993				29-Mar-93													
BLDG. NO. 5285										<input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER										DRAWING NO.				SHT OF													
DUAL TEMP WATER PUMP										ESTIMATOR										KC				CHECKED BY CEL													
SYS. NO. CHW PUMP -5										LABOR										MATERIAL										TOTAL				SHIPPING			
TASK DESCRIPTION										No. Of Units MH/ Unit Total Hrs										Unit Price Cost Unit Price Cost										Unit Price Cost Unit Price Cost				Unit Price Cost Unit Price Cost			
Digital Output										1 EA 2 2.2 26										43										\$99							
Analog Output																																					
Digital Input										1 EA 2 2.4 26										52										\$114							
Pressure Switch (Elec)										1 EA 2 1.9 24										51										\$97							
Analog Input																																					
Temp. Space										2 EA 3 5.3 26										174										\$483							
Temp. Water (Elec)										2 EA 3 6.3 26										222										\$605							
Temp. Water (Plum)										2 EA 2 4.3 24										65										\$234							
TOTAL THIS SHEET																														\$1,068				\$1,633			

COST ESTIMATE ANALYSIS

COST ESTIMATE ANALYSIS										INVITATION NO./CONTRACT NO.				EFFECTIVE PRICING		DATE PREPARED	
PROJECT		EMCS FEASIBILITY STUDY		DACA41-92-C-0098		MARCH 1993		29-Mar-93		LOCATION		FT. LEONARD WOOD, MISSOURI		DRAWING NO.		SHT OF	
BLDG. NO.		5265		CODE A <input type="checkbox"/>		CODE B <input type="checkbox"/>		CODE C <input type="checkbox"/>		OTHER <input type="checkbox"/>		ESTIMATOR		KC		CHECKED BY	
STEAM HW CONVERTER		Quantity		LABOR		EQUIPMENT		MATERIAL		TOTAL		SHIPPING		CEL		Total	
SYS. NO.	CV-1	No. Of Units	Unit Meas	MH/ Unit	Total Hrs	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost
TASK DESCRIPTION		Control Relay		1 EA		2		2.2		26		\$56		43		\$99	
Digital Output																	
Analog Output		1 EA		4		4.1		26		\$106		295		\$295		\$402	
Digital Input		1 EA		2		2.4		26		\$62		52		\$52		\$114	
		1 EA		2		1.9		24		\$47		51		\$51		\$97	
Analog Input		1 EA		3		3.1		26		\$81		222		\$222		\$303	
		1 EA		2		2.1		24		\$52		65		\$65		\$117	
TOTAL THIS SHEET										\$403				\$728		\$1,132	

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY										INVITATION NO./CONTRACT NO. DACA41-92-C-0098				EFFECTIVE PRICING MARCH 1993		DATE PREPARED 28-Mar-93	
LOCATION FT. LEONARD WOOD, MISSOURI										CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/>				DRAWING NO.		SHT OF	
BLDG. NO. 5265										OTHER <input type="checkbox"/>				ESTIMATOR		CHECKED BY	
STEAM HW CONVERTER										LABOR				MATERIAL		TOTAL	
SYS. NO. CV-2										MH/ Unit				Unit Price		Unit Wt	
TASK DESCRIPTION										Total Hrs				Cost		Total Wt	
Digital Output										1 EA 2 2.2				\$56		\$99	
Analog Output										1 EA 4 4.1				\$106		\$402	
Digital Input										1 EA 2 2.4				\$62		\$114	
Pressure Switch (Elec)										1 EA 2 1.9				\$47		\$97	
Pressure Switch (Plum)																	
Temp. Water (Elec)										1 EA 3 3.1				\$81		\$303	
Temp. Water (Plum)										1 EA 2 2.1				\$52		\$117	
TOTAL THIS SHEET														\$403		\$1,192	

COST ESTIMATE ANALYSIS

[illegible]

COST ESTIMATE ANALYSIS

PROJECT										INVITATION NO./CONTRACT NO.										EFFECTIVE PRICING		DATE PREPARED																																			
EMCS FEASIBILITY STUDY										DACA41-92-C-0098										MARCH 1993		29-Mar-93																																			
LOCATION FT. LEONARD WOOD, MISSOURI																				DRAWING NO.		SHT OF																																			
BLDG. NO. 5265										CODE A <input type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/>																																															
										OTHER <input type="checkbox"/>																																															
ELECTRIC DW HEATER										LABOR										EQUIPMENT										MATERIAL										ESTIMATOR		KC		CHECKED BY		CEL											
SYS. NO. DHW-2										MH/ Unit										Unit Price										Unit Price										Cost		TOTAL		Unit		SHIPPING											
TASK DESCRIPTION										Total Hrs										Unit Price										Unit Price										Cost		TOTAL		Unit		Total Wt											
Digital Output										1 EA										3										2.9										26										\$75		77		\$152			
H/O/A & Control Relay																																																									
Analog Output																																																									
Digital Input										1 EA										2										1.9										26										\$49		41		\$91			
Analog Input																																																									
TOTAL THIS SHEET																																																									

COST ESTIMATE

BUILDING 5267

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY										INVITATION NO./CONTRACT NO.										EFFECTIVE PRICING		DATE PREPARED	
LOCATION FT. LEONARD WOOD, MISSOURI										DACA41-92-C-0098										MARCH 1993		29-Mar-93	
BLDG. NO. 5267										<input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER										DRAWING NO.		SHT OF	
DUAL TEMP WATER PUMP										ESTIMATOR										KC		CHECKED BY CEL	
SYS. NO. HW PUMP										MATERIAL										TOTAL		SHIPPING	
TASK DESCRIPTION										Unit Price										Cost		Unit Wt	
Digital Output										43										\$43		\$99	
Analog Output																							
Digital Input										52										\$52		\$114	
Pressure Switch (Elec)										51										\$51		\$97	
Pressure Switch (Plum)																							
Analog Input										174										\$348		\$483	
Temp. Space										222										\$444		\$805	
Temp. Water (Elec)										65										\$130		\$234	
Temp. Water (Plum)																							
TOTAL THIS SHEET																				\$1,068		\$1,633	

COST ESTIMATE ANALYSIS

PROJECT										INVITATION NO./CONTRACT NO.				EFFECTIVE PRICING		DATE PREPARED									
LOCATION										DACA41-92-C-0098				MARCH 1993		29-Mar-93									
BLDG. NO. 5267										<input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER				DRAWING NO.		SHT OF									
DUAL TEMP WATER PUMP										LABOR		EQUIPMENT		MATERIAL		ESTIMATOR		KC		CHECKED BY		CEL			
SYS. NO.										Quantity		MH/		Unit		Total		Unit		Shipping		Total			
TASK DESCRIPTION										No. Of		Unit		Unit		Price		Cost		Unit		Wt		Wt	
Digital Output										1		EA		2		2.2		26		43		\$99			
Analog Output																									
Digital Input										1		EA		2		2.4		26		52		\$114			
Pressure Switch (Elec)										1		EA		2		1.9		24		51		\$97			
Analog Input										2		EA		3		5.3		26		174		\$483			
Temp. Space										2		EA		3		6.3		26		222		\$605			
Temp. Water (Elec)										2		EA		2		4.3		24		65		\$234			
Temp. Water (Plum)																									
TOTAL THIS SHEET																								\$1,633	

COST ESTIMATE

BUILDING 6150

COST ESTIMATE ANALYSIS

INVITATION NO./CONTRACT NO.

EFFECTIVE PRICING

DATE PREPARED

PROJECT EMCS FEASIBILITY STUDY

LOCATION	FT. LEONARD WOOD, MISSOURI
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
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95	95
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97	97
98	98
99	99
100	100

BLDG. NO. 6150

DACA41-92-C-0098

CODE A	CODE X	CODE B	CODE C
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ОТН

MARCH 1993	29-Mar-93
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SHT OF

BLDG NO 81

MULTIZONE AHI!

SYS NO HVAC=1

CIS: NO.	TASK DESCRIPTION
1	1
2	2
3	3
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13	13
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34	34
35	35

TASK DESCRIPTION	
Digital Output	Control Relay

Digital Output	Control Relay
	HIO/A & Control Relay

7/0/A & CONTROL RELAY

1000

1-1-0-4-1	1-1-0-4-1
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CPA (Dampen)	CPA (Vib.)	Analog Output

CPA (Value)

A blank coordinate grid with x and y axes ranging from -10 to 10. The grid is used for plotting the graph of the function $y = \frac{1}{2}x^2 - 2$.

Digital Input	Diff. Pressure Sw. (Fan)
0	0
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10
11	11
12	12
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98	98
99	99

Diff. Pressura SW / Filtro

DATE RECEIVED: (mm/dd/yyyy)

End Position Switch

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY LOCATION FT. LEONARD WOOD, MISSOURI BLDG. NO. 6150										INVITATION NO./CONTRACT NO. DACA41-92-C-0098 CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER <input type="checkbox"/>				EFFECTIVE PRICING MARCH 1993 DRAWING NO.		DATE PREPARED 29-Mar-93 SHT OF	
FAN COIL SYS. NO. FC-1										ESTIMATOR		KC		CHECKED BY CEL			
TASK DESCRIPTION Control Relay										MATERIAL		TOTAL		SHIPPING			
Quantity No. Of Units Unit Meas MH/ Unit Total Hrs Unit Price Cost Unit Price Cost Unit Price Cost										Unit Price Cost		Unit Price Cost		Unit Price Cost			
1 EA 2 2.2 26 \$56										43 \$43		\$99					
Analog Output ACU (Fan Coil)										415 \$415		\$508					
Digital Input																	
Analog Input Temp. Space (RTD Only)										50 \$50		\$117					
TOTAL THIS SHEET										\$508		\$725					

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY										INVITATION NO./CONTRACT NO.				EFFECTIVE PRICING		DATE PREPARED	
LOCATION FT. LEONARD WOOD, MISSOURI										DACA41-92-C-0098				MARCH 1993		29-Mar-93	
BLDG. NO. 6150										<input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER				DRAWING NO.		SHT OF	
STEAM HW CONVERTER										ESTIMATOR				KC		CHECKED BY CEL	
SYS. NO. CV-1										MATERIAL				TOTAL		SHIPPING	
TASK DESCRIPTION										Unit Price				Cost		Unit Wt	
Digital Output										43				\$43		\$99	
Analog Output										295				\$295		\$402	
Digital Input										52				\$52		\$114	
Analog Input										51				\$51		\$97	
TOTAL THIS SHEET										\$403				\$728		\$1,132	

COST ESTIMATE ANALYSIS

[illegible]

COST ESTIMATE

BUILDING 6505

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY										INVITATION NO./CONTRACT NO.				EFFECTIVE PRICING		DATE PREPARED	
LOCATION FT. LEONARD WOOD, MISSOURI										DACA41-92-C-0098				MARCH 1993		29-Mar-93	
BLDG. NO. 6505										<input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER				DRAWING NO.		SHT OF	
SEWAGE LIFT STATION										LABOR				ESTIMATOR		CHECKED BY	
SYS. NO. WATER										Quantity No. Of Units Unit Meas EA 3				Unit Price 26		Unit Wt 77	
TASK DESCRIPTION										Total Hrs 3				Unit Price 26		Unit Wt 77	
Digital Output										H/O/A & Control Relay				Unit Price 26		Unit Wt 77	
Analog Output																	
Digital Input										Pressure Switch (Elec) 6 EA 2 14.5 26 \$373				Unit Price 26		Unit Wt 52	
										Pressure Switch (Plum) 6 EA 2 11.5 24 \$280				Unit Price 24		Unit Wt 51	
										Diff. Pressure Sw. (Filter) EA 3 26				Unit Price 26		Unit Wt 71	
										Level Switch 1 EA 4 3.9 26 \$101				Unit Price 26		Unit Wt 136	
										Status Relay EA 2 26				Unit Price 26		Unit Wt 41	
										Current Switch EA 2 26				Unit Price 26		Unit Wt 111	
Analog Input										PSIG/PSID (Elec) 2 EA 3 6.3 26 \$161				Unit Price 26		Unit Wt 202	
										PSIG/PSID (Plum) 2 EA 2 4.3 24 \$104				Unit Price 24		Unit Wt 55	
										Flow (Elec) 1 EA 3 3.1 26 \$81				Unit Price 26		Unit Wt 737	
										Flow (Plum) 1 EA 2 2.1 24 \$52				Unit Price 24		Unit Wt 86	
TOTAL THIS SHEET														Unit Price \$1,150		Unit Wt \$3,238	

I/O SUMMARY

BUILDING 7391

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY LOCATION FT. LEONARD WOOD, MISSOURI BLDG. NO. 7391 SINGLE ZONE & VAV AHU SYS. NO. AHU-7										INVITATION NO./CONTRACT NO. DACA41-92-C-0098 CODE A <input type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER <input type="checkbox"/>				EFFECTIVE PRICING MARCH 1993 DRAWING NO.		DATE PREPARED 29-Mar-93 SHT OF	
										ESTIMATOR		KC		CHECKED BY CEL			
										MATERIAL		TOTAL		SHIPPING			
										Unit		Unit		Wt			
										Price		Cost		Wt			
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										Unit		Unit		Wt			

COST ESTIMATE ANALYSIS

[illegible]

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY LOCATION FT. LEONARD WOOD, MISSOURI BLDG. NO. 7391										INVITATION NO./CONTRACT NO. DACA41-92-C-0098 CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER <input type="checkbox"/>				EFFECTIVE PRICING MARCH 1993 DRAWING NO.		DATE PREPARED 29-Mar-93 SHT OF							
HOT WATER BOILER SYS. NO. BLR-1 TASK DESCRIPTION Control Relay										LABOR No. Of Units 1 EA		EQUIPMENT Unit Price 26		MATERIAL Unit Price 43		ESTIMATOR Cost \$56		KC Total \$99		CHECKED BY CEL SHIPPING Unit Wt			
Analog Output CPA (Electric)										1 EA		4.1		26		295		\$295		\$402			
Digital Input Pressure Switch (Elec) Pressure Switch (Plum) Auxiliary Contact Status Relay										2 1 EA 1 EA 1 EA		2 1.9 1.9 1.9		26 24 26 26		52 51 43 41		\$47 \$51 \$43 \$41		\$97 \$92 \$91			
Analog Input Temp. Water (Elec) Temp. Water (Plum)										2 EA 2 EA		3 2		6.3 4.3		26 24		222 65		\$444 \$130		\$605 \$234	
TOTAL THIS SHEET																				\$1,048 \$1,620			

COST ESTIMATE

BUILDING 9000

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY LOCATION FT. LEONARD WOOD, MISSOURI BLDG. NO. 9000										INVITATION NO./CONTRACT NO. DAC441-92-C-0098 CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER <input type="checkbox"/>				EFFECTIVE PRICING MARCH 1993 DRAWING NO.		DATE PREPARED 29-Mar-93 SHT OF													
AHU SYS. NO. ACU-1 TASK DESCRIPTION Control Relay										LABOR No. Of Units 1 EA		Quantity Unit 1 EA		MH/ Unit 2		Total Hrs 2.2		Cost \$56		EQUIPMENT Unit Price 43		MATERIAL Unit Price 43		ESTIMATOR Cost \$43		TOTAL \$99		CHECKED BY CEL SHIPPING Unit Wt	
Analog Output CPA (Valve)										1 EA		3.1		3		26		\$81		295		\$295		\$376					
Digital Input Diff. Pressure Sw. (Fan)										1 EA		3.4		3		26		\$88		71		\$71		\$159					
Analog Input Temp. Space										2 EA		5.3		3		26		\$135		174		\$348		\$483					
TOTAL THIS SHEET																\$360				\$757		\$1,117							

COST ESTIMATE ANALYSIS

PROJECT										INVITATION NO./CONTRACT NO.										EFFECTIVE PRICING		DATE PREPARED													
LOCATION										DACA41-92-C-0098										MARCH 1993		29-Mar-93													
BLDG. NO.										<input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER										DRAWING NO.		SHT OF													
AHU										LABOR										EQUIPMENT		MATERIAL		ESTIMATOR		KC		CHECKED BY		CEL					
SYS. NO.		ACU-2		TASK DESCRIPTION		Quantity		MH/		Total		Unit		Cost		Unit		Price		Cost		Unit		Price		Cost		Unit		Wt		Total		Wt	
Digital Output		1		EA		2		2.2		26		\$56				43				\$43															
Analog Output		1		EA		3		3.1		26		\$81				295				\$295															
Digital Input		1		EA		3		3.4		26		\$88				71				\$71															
Analog Input		2		EA		3		5.3		26		\$135				174				\$348															
Temp. Space																																			
TOTAL THIS SHEET												\$380								\$757															

COST ESTIMATE ANALYSIS

[illegible]

COST ESTIMATE ANALYSIS

PROJECT EMCS FEASIBILITY STUDY										INVITATION NO./CONTRACT NO.										EFFECTIVE PRICING				DATE PREPARED																																																																													
LOCATION FT. LEONARD WOOD, MISSOURI										DACA41-92-C-0098										MARCH 1993				29-Mar-93																																																																													
BLDG. NO. 9000										<input type="checkbox"/> CODE A <input checked="" type="checkbox"/> CODE B <input type="checkbox"/> CODE C <input type="checkbox"/> OTHER										DRAWING NO.				SHT OF																																																																													
AIR COOLED DX COMPRESSOR										ESTIMATOR										KC				CHECKED BY CEL																																																																													
SYS. NO. ACCU-2										LABOR										MATERIAL										TOTAL				SHIPPING																																																																			
TASK DESCRIPTION										Quantity										EQUIPMENT										MATERIAL										Total				Wt																																																									
Digital Output										No. Of Units 1 EA										MH/ Unit 2										Total Hrs 2.2										Unit Price 26										Cost \$56										Unit Price 43										Cost \$43										\$99																					
Analog Output																																																																																																					
Digital Input										1 EA										2										1.9										26										\$49										41										\$41										\$91																					
Analog Input																																																																																																					
TOTAL THIS SHEET																																																																																										\$105				\$85				\$190			

COST ESTIMATE ANALYSIS

[illegible]

APPENDIX H
FIELD SURVEY NOTES

FIELD SURVEY NOTES

**BUILDINGS 181, 183, 184, 185, 186, 187, 193,
194, 195, 196, 198, & 199**

FIELD SURVEY NOTES

TO: FILE, FT. LEONARD WOOD
FR: CARL LUNDSTROM
DT: 16 NOVEMBER 1992

RE: BLDG SEWAGE TREATMENT PLANT

Equipment to monitor status:

Bldg 181:

- 2 HW boilers
- 4 HW pumps
- 4 water pumps
- Status on generator
- Phases on electrical service
- Amps per phase

Bldg 183:

- Methane gas monitor
- Sump pump limit switch

Bldg 184:

- Temperature of sludge
- Status of 2 sludge pumps
- Gas monitor

Bldg 185:

- 4 sludge transfer pumps
- Old annunciator panel
- Central office for treatment plant

Bldg 187:

- 2 air compressors
- 2 bar screens
- 2 grit removers
- Water flow through channels
- 3 air blowers
- 2 grinders

Bldg 193:

- Secondary lift pumps, 5

- 2 air compressors
- Water level in wet well

Bldg 194:

- 4 pumps
- 2 wet well water levels

Bldg 195:

- Control drain valves on high level in filter
- Effluent flow
- chlorine feed rate
- 4 filter head pressure
- Water levels
- 2 compressors
- 2 back wash pumps
- 2 service water pumps
- water level in contact basin
- chlorine monitor alarm
- air tank pressure
- service water pressure
- 2 mixers

Bldg 196:

- 3 sludge pumps
- chemical feed rate, 6 pumps
- 2 clarifier drive units
- 2 mixers
- 4 flocculators

Bldg 198:

- Lift station pump status

Bldg 199:

- Sludge pump
- Water level

Every building needs a basement water high level alarm

FIELD SURVEY NOTES

BUILDING 320

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD

BLDG: 320

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: BHS

CHECKED BY: CEL

FILE: 320BLG

VI. BUILDING DATA SURVEY OBSERVATIONS

BLDG NO: 320 BLDG NAME: ADMIN

ZONE NO.	1		FUNCTION: ADMIN						
OCCUPANCY HOURS:	M—F	800	TO	1700	SAT	0	TO	0	
	SUN	0	TO	0					
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F				
	SUMMER OCC	°F		UNOCC	°F				

ZONE NO.		FUNCTION:							
OCCUPANCY HOURS:		M—F		TO		SAT		TO	
		SUN		TO					
PRESENT TEMP	WINTER OCC		°F		UNOCC	°F			
	SUMMER OCC		°F		UNOCC	°F			

ZONE NO.		FUNCTION:							
OCCUPANCY HOURS:		M—F		TO		SAT		TO	
		SUN		TO					
PRESENT TEMP	WINTER OCC		°F		UNOCC	°F			
	SUMMER OCC		°F		UNOCC	°F			

REMARKS:

FILE: 320AH1

CONTROLS									
		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:	X	SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):	78	OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	N	MAX OA (Y/N)	N	RA (Y/N)	N	EA (Y/N)	
		MA CONTROL		ECONO - DB		ECONO - ENT		OTHER	
DEMAND LIMIT:	N	(Y/N)							
COMMENTS:									

FILE: 320AH2

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:	X	SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):	78	OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	N	MAX OA (Y/N)	N	RA (Y/N)	N	EA (Y/N)	
		MA CONTROL		ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:	N	(Y/N)							
COMMENTS:									

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY
CLIENT CONTRACT NO.: DACA 41-92-C-0098
CLIENT PROJ. ENG: DOUG CAGE
LOCATION: FT. LEONARD WOOD BLDG: 320

DATE: Mar-93
PREPARED BY: AJN
CHECKED BY: CEL
FILE: 320CH1

REFRIGERATION EQUIPMENT SURVEY OBSERVATIONS			
ACCU-1	CHILLER/COMPRESSOR NO.	OUTSIDE BLDG	LOCATION (RM)

UNIT TYPE:									
	CENTRIFUGAL WITH WATER SIDE COOLING TOWER					OTHER			
	RECIPROCATING WITH WATER SIDE COOLING TOWER				X	AHU'S SERVED		AHU-1	
	RECIPROCATING WITH AIR COOLED CONDENSING UNIT								
	ABSORBTION WITH WATER SIDE COOLING TOWER								
X	AIR COOLED CONDENSING UNIT								
	CHW	X	DX		OTHER				

NAMEPLATE:											
CHILLER CARRIER		MFG.	338CC036500				MODEL				SERIAL NO.
230	VOLTS	12.8	MCA	3	PH	60	HZ	3	CAPACITY (TONS)		
CONDENSER FANS		MFG.					MODEL				1 # OF FANS
230	VOLTS	2	AMPS	1	PH	60	HZ	0.17	HP		
DTW PUMP		MFG.					MODEL				SERIAL NO.
	VOLTS		AMPS		PH		HZ		HP		
CNW PUMP		MFG.					MODEL				SERIAL NO.
	VOLTS		AMPS		PH		HZ		HP		
COMMENTS:											

OPERATION:											
HOURS ON:		S	M	T	W	T	F	S	COMMENT		
PRESENT START TIME		0	0	0	0	0	0	0	TIMECLOCK?		
PRESENT STOP TIME		2400	2400	2400	2400	2400	2400	2400	NO		
REQUIRED START TIME		0	800	800	800	800	800	0			
REQUIRED STOP TIME		0	1700	1700	1700	1700	1700	0			
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
0	0	0	0	1	1	1	1	1	0	0	0

CONTROLS:									
		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
SETPOINTS		CWS (oF)		CWR (oF)		CNWS (oF)		CNWR (oF)	
PANEL INDICATORS									
- PRESSURE		LITE - HI		LITE - LOW		GAUGES			
- TEMPERATURE		LITE - HI		LITE - LOW		GAUGES			
- OTHER									
COMMENTS:									

COMMENTS:

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 320

EMC NO.: #3204.000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 320DHW1

DOMESTIC HW SURVEY OBSERVATIONS

DHW-1	BOILER/CONVERTER NO.	MECH. CLOSET	LOCATION (RM)
ELEC.	SOURCE OF HEATING (PLANT)	ALL	SERVES AREA

UNIT TYPE:

NO.2 OIL	NO.6 OIL	N.GAS	X	ELEC	FUELS:
STM/HW	HTHW/HW	HTHW/STM		OTHER	CONVERTER TYPE:

COMMENT:

NAMEPLATE:

DAYTON	MFG.	3E111K	MODEL	1650	CAPACITY OUTPUT (WATTS)
	MFG.		MODEL		CAPACITY OUTPUT (BTUH)

DOMESTIC HW CIRCULATION PUMP: NONE

HW PUMP 1 - HP	MFG.	MODEL
HW PUMP 2 - HP	MFG.	MODEL
HW PUMP 3 - HP	MFG.	MODEL

COMMENT:

DIMENSION:	20	DIAMETER (INCHES)	24	HEIGHT OR LENGTH (INCHES)	19 GALLON
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OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENT			
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?			
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	NO			
REQUIRED START TIME	0	800	800	800	800	800	0				
REQUIRED STOP TIME	0	1700	1700	1700	1700	1700	0				
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	1	1	1	1	1	1	1	1

CONTROLS:

	PNEUMATIC	X	ELECTRIC	ELEC'NIC	DDC	COMMENTS
SETPOINTS			HW SUPPLY			
COMMENTS:						

FIELD SURVEY NOTES

BUILDING 404

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD

BLDG: 404

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 404BLG

VI. BUILDING DATA SURVEY OBSERVATIONS

BLDG NO: 404 BLDG NAME: TELEPHONE EXCHANGE

ZONE NO.	1		FUNCTION: TELEPHONE OPERATIONS						
OCCUPANCY HOURS:	M-F	0	TO	2400	SAT	0	TO	2400	
	SUN	0	TO	2400					
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F				
	SUMMER OCC	°F		UNOCC	°F				

ZONE NO.		FUNCTION:							
OCCUPANCY HOURS:		M—F		TO		SAT		TO	
		SUN		TO					
PRESENT TEMP	WINTER OCC		°F		UNOCC	°F			
	SUMMER OCC		°F		UNOCC	°F			

ZONE NO.		FUNCTION:							
OCCUPANCY HOURS:		M—F		TO		SAT		TO	
		SUN		TO					
PRESENT TEMP	WINTER OCC		°F		UNOCC	°F			
	SUMMER OCC		°F		UNOCC	°F			

REMARKS: COMMUNICATIONS ROOM CONTAINS VARIOUS COMMUNICATION AND COMPUTER EQUIPMENT - MAIN FRAME COMPUTERS, MULTIPLEXERS, ETC.
FOUR BSC AC-UNITS ARE LOCATED IN THE COMMUNICATION ROOM, SERVED BY TWO ACCU's OUTSIDE BUILDING
FM RADIO CONTROL ON LCP, UNABLE TO DETERMINE IF CONTROL IS FOR AHU-1 OR REFRIGERATION COMPRESSOR
AHU-1 HAS AIRWASHER FOR HUMIDITY CONTROL

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY
CLIENT CONTRACT NO.: DACA 41-92-C-0098
CLIENT PROJ. ENG: DOUG CAGE
LOCATION: FT. LEONARD WOOD BLDG: 404

DATE: Mar-93
PREPARED BY: AJN
CHECKED BY: CEL
FILE: 404AH1

AIR HANDLING UNIT SURVEY OBSERVATIONS			
AHU-1	AHU NO.	MECH. ROOM	LOCATION (RM)
CH-1	REF. SYS. SERVING AHU	ALL	SERVES AREA

UNIT TYPE:									
	SINGLE ZN		2-PIPE FC		4-PIPE FC		UNIT HTR		H&V
X	MULTIZONE		DOUBLE DT		REHEAT		INDUCTION		VAV
4	NUMBER OF ZONES				OTHER				
	COMMENT:								

NAMEPLATE:																			
THERMAL ENGINEERING						MFG.		MT-223HC				MODEL							
5.0		SUPPLY FAN HP		MARATHON		MFG.		8A184TTDR7D43AAW				MODEL							
		RET/EXH FAN HP				MFG.						MODEL							
15000		CFM-HTG		15000		CFM-CLG		0%		MIN %OA		50%		MAX %OA		100%		% HTG AREA SERVED	
COMMENT:																			

COILS:										
X	NONE		STM		HW		ELEC		MOD VLV	PREHEAT
	NONE		STM	X	HW		ELEC	X	MOD VLV	HEATING
X	NONE		STM		HW		ELEC		MOD VLV	REHEAT
X	NONE		STM		HW		ELEC		MOD VLV	HUMID.
	NONE	X	DX		CW			LLSV	MOD VLV	COOLING

[illegible]

CONTROLS:									
		PNEUMATIC		ELECTRIC	X	ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)	N	EA (Y/N)	
		MA CONTROL		ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:	Y	YES		NO					
COMMENTS: ELECTRIC ACTUATORS; RETURN AND O.A. SHARE SAME DAMPER									

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 404

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 404CH1

REFRIGERATION EQUIPMENT SURVEY OBSERVATIONS

CH-1	CHILLER/COMPRESSOR NO.	MECH. ROOM	LOCATION (RM)

UNIT TYPE:

	CENTRIFUGAL WITH WATER SIDE COOLING TOWER		OTHER
X	RECIPROCATING WITH WATER SIDE COOLING TOWER	X	AHU'S SERVED AHU-1
	RECIPROCATING WITH AIR COOLED CONDENSING UNIT		
	ABSORPTION WITH WATER SIDE COOLING TOWER		
	AIR COOLED CONDENSING UNIT		
	CHW	X	DX
			OTHER

NAMEPLATE:

CHILLER	TRANE	MFG.	FC-25	MODEL	157815	SERIAL NO.
208	VOLTS	70	AMPS	3	PH	60
						25
						CAPACITY (TONS)
TOWER		MFG.		MODEL		1
						# OF FANS
	VOLTS		AMPS		PH	3
						HP
CW PUMP		MFG.		MODEL		
						SERIAL NO.
200	VOLTS	5.5	AMPS	3	PH	60
						5
						HP
CNW PUMP		MFG.		MODEL		
						SERIAL NO.
	VOLTS		AMPS		PH	
						HP

COMMENTS: WATER LOAD DX CHILLER

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENT			
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?			
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	NO TIMECLOCK			
REQUIRED START TIME	0	0	0	0	0	0	0				
REQUIRED STOP TIME	2400	2400	2400	2400	2400	2400	2400				
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
0	0	0	0	1	1	1	1	1	0	0	0

CONTROLS:

	PNEUMATIC	X	ELECTRIC	ELEC'NIC	DDC	COMMENTS
SETPOINTS	CWS (oF)		CWR (oF)	CNWS (oF)	CNWR (oF)	
PANEL INDICATORS						
- PRESSURE	LITE-HI		LITE-LOW	GAUGES		
- TEMPERATURE	LITE-HI		LITE-LOW	GAUGES		
- OTHER						

COMMENTS: GAUGES: EVAPORATOR PRESSURE, OIL PRESSURE, CONDENSER PRESSURE;

CONTROLS ARE IN FAIR CONDITION

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY
CLIENT CONTRACT NO.: DACA 41-92-C-0098
CLIENT PROJ. ENG: DOUG CAGE
LOCATION: FT. LEONARD WOOD BLDG: 404

EMC NO.: #3204.000

DATE: Mar-93

PREPARED BY: **AJN**

CHECKED BY: CEL

FILE: 404BLR1

BOILER & CONVERTER SURVEY OBSERVATIONS

BLR-1	BOILER/CONVERTER NO.	MECH. RM.	LOCATION (RM)
	SOURCE OF HEATING (PLANT)	ALL	SERVES AREA

UNIT TYPE:

	STEAM		PSIG	X	HW		TEMP.		BOILER TYPE:
	NO.2 OIL		NO.6 OIL	X	N. GAS		ELEC		FUELS:
	STM/HW		HTHW/HW		HTHW/STM		OTHER		CONVERTER TYPE:
X	SPACE HEAT		DHW		OTHER				USE:
COMMENT:							0.0%	% HTG AREA SERVED	
								BB RADIATION ONLY	

NAMEPLATE:

PARKE		MFG.	0-1008	MODEL	1008000	CAPACITY OUTPUT (BTUH)
					1260000	CAPACITY INPUT (BTUH)
		MFG.		MODEL		CAPACITY OUTPUT (BTUH)
						CAPACITY INPUT (BTUH)
0.5	HW PUMP 1 - HP	BELL & GOSSETT		MFG.		MODEL
	HW PUMP 2 - HP			MFG.		MODEL
	HW PUMP 3 - HP			MFG.		MODEL
COMMENT:						

OPERATION:

HOURS ON:		S	M	T	W	T	F	S	COMMENT		
PRESENT START TIME		0	0	0	0	0	0	0	TIMECLOCK?		
PRESENT STOP TIME		2400	2400	2400	2400	2400	2400	2400			
REQUIRED START TIME		0	0	0	0	0	0	0			
REQUIRED STOP TIME		2400	2400	2400	2400	2400	2400	2400			
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	0	0	0	0	0	1	1	1

CONTROLS:

CONTROLS									
		PNEUMATIC		ELECTRIC	X	ELEC'NIC		DDC	COMMENTS
SETPOINTS		PSIG		HW SUPPLY					
RESET CONTROL (oF)	185	HW HIGH	N	HW LOW	N	OA LOW	N	OA HIGH	
BURNER CONTROLS		O2 TRIM (Y/N)		OTHER					
COMMENTS: CONTROLS ARE IN FAIR CONDITION									

COMMENTS:

FIELD SURVEY NOTES

BUILDING 498

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD

BLDG: 498

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 498BLG

VI. BUILDING DATA SURVEY OBSERVATIONS

BLDG NO: 498 BLDG NAME: OLD COMMISSARY

ZONE NO.	1	FUNCTION: ADMINISTRATION						
OCCUPANCY HOURS:	M – F	700	TO	1700	SAT	0	TO	0
	SUN	0	TO	0				
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F			
	SUMMER OCC	°F		UNOCC	°F			

ZONE NO.		FUNCTION:							
OCCUPANCY HOURS:		M-F		TO		SAT		TO	
		SUN		TO					
PRESENT TEMP	WINTER OCC		°F		UNOCC	°F			
	SUMMER OCC		°F		UNOCC	°F			

ZONE NO.		FUNCTION:							
OCCUPANCY HOURS:		M—F		TO		SAT		TO	
		SUN		TO					
PRESENT TEMP	WINTER OCC		°F		UNOCC	°F			
	SUMMER OCC		°F		UNOCC	°F			

REMARKS:

LOCATION: FT. LEONARD WOOD BLDG: 498

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: **AJN**

CHECKED BY: CEL

FILE: 498AH1

AIR HANDLING UNIT SURVEY OBSERVATIONS

AHU-1	AHU NO.	MEZZ. MECH. RM	LOCATION (RM)
ACCU-1	REF. SYS. SERVING AHU	PRODUCE PREP	SERVES AREA

UNIT TYPE:

	SINGLE ZN		2-PIPE FC		4-PIPE FC		UNIT HTR		H&V
X	MULTIZONE		DOUBLE DT		REHEAT		INDUCTION		VAV
4	NUMBER OF ZONES				OTHER				
	COMMENT:	PNEUMATIC ACTUATORS							

NAMEPLATE:

NO NAME PLATE					MFG.					MODEL
3.0	SUPPLY FAN HP				MFG.					MODEL
	RET/EXH FAN HP				MFG.					MODEL
1730	CFM-HTG	1730	CFM-CLG	10%	MIN %OA	100%	MAX %OA	4.4%	% HTG AREA SERVED	
COMMENT:										

COILS:

X	NONE		STM		HW		ELEC		MOD VLV	PREHEAT
	NONE		STM	X	HW		ELEC	X	MOD VLV	HEATING
X	NONE		STM		HW		ELEC		MOD VLV	REHEAT
X	NONE		STM		HW		ELEC		MOD VLV	HUMID.
	NONE	X	DX		CW			X	MOD VLV	COOLING

OPERATION:

[illegible]

CONTROLS:

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)	N	EA (Y/N)	
		MA CONTROL		ECONO - DB		ECONO - ENT		OTHER	
DEMAND LIMIT:	Y	YES		NO					
COMMENTS:									

LOCATION: FT. LEONARD WOOD BLDG: 498

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: **AJN**

CHECKED BY: CEL

FILE: 498AH2

AIR HANDLING UNIT SURVEY OBSERVATIONS

AHU-2	AHU NO.	MEZZ. MECH. RM	LOCATION (RM)
ACCU-1	REF. SYS. SERVING AHU	STORAGE	SERVES AREA

UNIT TYPE:

X	SINGLE ZN		2-PIPE FC		4-PIPE FC		UNIT HTR		H&V
	MULTIZONE		DOUBLE DT		REHEAT		INDUCTION		VAV
	NUMBER OF ZONES				OTHER				
	COMMENT:	DX COIL ONLY; LIQUID LINE IS CUT AND CAPPED							

NAMEPLATE:

CARRIER					MFG.	39AC 6033T8				MODEL
1.5	SUPPLY FAN HP	CENTURY			MFG.	SZ-184-SZ4-7				MODEL
	RET/EXH FAN HP				MFG.					MODEL
8000	CFM-HTG	0	CFM-CLG	0%	MIN %OA	0%	MAX %OA	0.0%	% HTG AREA SERVED	
COMMENT:										

COILS:

X	NONE		STM		HW		ELEC		MOD VLV	PREHEAT
X	NONE		STM		HW		ELEC		MOD VLV	HEATING
X	NONE		STM		HW		ELEC		MOD VLV	REHEAT
X	NONE		STM		HW		ELEC		MOD VLV	HUMID.
	NONE	X	DX		CW				MOD VLV	COOLING

OPERATION:

HOURS ON:		S	M	T	W	T	F	S	COMMENTS		
PRESENT START TIME		0	0	0	0	0	0	0	TIMECLOCK?		
PRESENT STOP TIME		2400	2400	2400	2400	2400	2400	2400	NO		
REQUIRED START TIME		0	700	700	700	700	700	0			
REQUIRED STOP TIME		0	1700	1700	1700	1700	1700	0			
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
0	0	0	0	1	1	1	1	1	0	0	0

CONTROLS:

	X	PNEUMATIC		ELECTRIC		ELEC'N'IC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)	N	EA (Y/N)	
		MA CONTROL		ECONO-DB		ECONO-ENT	X	OTHER	FACE & BYPASS
DEMAND LIMIT:	Y	YES		NO					DAMPERS
COMMENTS:									

CONTROLS:

FILE: 498AH4

		PNEUMATIC		ELECTRIC	X	ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			JC 80 SYSTEM
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)	N	EA (Y/N)	
		MA CONTROL		ECONO-DB		ECONO-ENT	X	OTHER	
DEMAND LIMIT:	Y	YES		NO					
COMMENTS:									

CONTROLS:

FILE: 498FC2

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (°F):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (°F):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	N	MAX OA (Y/N)	N	RA (Y/N)	N	EA (Y/N)	
		MA CONTROL		ECONO – DB		ECONO – ENT		OTHER	
DEMAND LIMIT:	N	(Y/N)							
COMMENTS:									

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 498

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 498CH1

REFRIGERATION EQUIPMENT SURVEY OBSERVATIONS

CH-1	CHILLER/COMPRESSOR NO.	OUTSIDE BLDG	LOCATION (RM)

UNIT TYPE:

	CENTRIFUGAL WITH WATER SIDE COOLING TOWER		OTHER
	RECIPROCATING WITH WATER SIDE COOLING TOWER	X	AHU'S SERVED 9 FAN COIL UNITS
X	RECIPROCATING WITH AIR COOLED CONDENSING UNIT		(OFFICES)
	ABSORPTION WITH WATER SIDE COOLING TOWER		
	AIR COOLED CONDENSING UNIT		
X	CHW	DX	OTHER

NAMEPLATE:

CHILLER	TSI	MFG.	30AOC515	MODEL	SERIAL NO.
208	VOLTS	53.5	AMPS 3 PH	60 HZ	14 CAPACITY (TONS)
CONDENSER FANS	MFG.	MODEL	2	# OF FANS	
	VOLTS	AMPS	PH	HZ	1 HP
DTW PUMP	MFG.	NO NAME PLATE	MODEL	SERIAL NO.	
	VOLTS	AMPS	PH	HZ	0.5 HP
CNW PUMP	MFG.	MODEL	SERIAL NO.		
	VOLTS	AMPS	PH	HZ	HP

COMMENTS:

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENT			
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?			
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	NO TIMECLOCK			
REQUIRED START TIME	0	700	700	700	700	700	0				
REQUIRED STOP TIME	0	1700	1700	1700	1700	1700	0				
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
0	0	0	0	1	1	1	1	1	0	0	0

CONTROLS:

	PNEUMATIC	X	ELECTRIC	ELEC'NIC	DDC	COMMENTS
SETPOINTS	CWS (oF)		CWR (oF)	CNWS (oF)	CNWR (oF)	
PANEL INDICATORS						
- PRESSURE	LITE-HI		LITE-LOW	GAUGES		
- TEMPERATURE	LITE-HI		LITE-LOW	GAUGES		
- OTHER						
COMMENTS:						

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 498

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 498CH2

REFRIGERATION EQUIPMENT SURVEY OBSERVATIONS

ACCU-2	CHILLER/COMPRESSOR NO.	MEZZ. LEVEL	LOCATION (RM)

UNIT TYPE:

	CENTRIFUGAL WITH WATER SIDE COOLING TOWER		OTHER
	RECIPROCATING WITH WATER SIDE COOLING TOWER	X	AHU'S SERVED AHU-1 & AHU-2
X	RECIPROCATING WITH AIR COOLED CONDENSING UNIT		
	ABSORPTION WITH WATER SIDE COOLING TOWER		
	AIR COOLED CONDENSING UNIT		
	CHW	X	DX OTHER

NAMEPLATE:

CHILLER CARRIER	MFG.	MODEL	SERIAL NO.
VOLTS	AMPS	PH	HZ
CONDENSER FANS	MFG.	MODEL	# OF FANS
VOLTS	AMPS	PH	HZ
DTW PUMP	MFG.	MODEL	SERIAL NO.
VOLTS	AMPS	PH	HZ
CNW PUMP	MFG.	MODEL	SERIAL NO.
VOLTS	AMPS	PH	HZ

COMMENTS:

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENT			
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?			
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	NO TIMECLOCK			
REQUIRED START TIME	0	700	700	700	700	700	0				
REQUIRED STOP TIME	0	1700	1700	1700	1700	1700	0				
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
0	0	0	0	1	1	1	1	1	0	0	0

CONTROLS:

	PNEUMATIC	X	ELECTRIC	ELEC'NIC	DDC	COMMENTS
SETPOINTS	CWS (oF)		CWR (oF)	CNWS (oF)	CNWR (oF)	
PANEL INDICATORS						
- PRESSURE	LITE-HI		LITE-LOW	GAUGES		
- TEMPERATURE	LITE-HI		LITE-LOW	GAUGES		
- OTHER						
COMMENTS:						

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY
CLIENT CONTRACT NO.: DACA 41-92-C-0098
CLIENT PROJ. ENG: DOUG CAGE
LOCATION: FT. LEONARD WOOD BLDG: **498**

EMC NO.: #3204-000
DATE: Mar-93
PREPARED BY: AJN
CHECKED BY: CEL
FILE: 498CH3

REFRIGERATION EQUIPMENT SURVEY OBSERVATIONS

CH-3	CHILLER/COMPRESSOR NO.	OUTSIDE MER	LOCATION (RM)

UNIT TYPE:

	CENTRIFUGAL WITH WATER SIDE COOLING TOWER						OTHER
X	RECIPROCATING WITH WATER SIDE COOLING TOWER					X	AHU'S SERVED AHU-3
	RECIPROCATING WITH AIR COOLED CONDENSING UNIT						
	ABSORPTION WITH WATER SIDE COOLING TOWER						
	AIR COOLED CONDENSING UNIT						
	CHW	X	DX		OTHER		

NAMEPLATE:

CHILLER	CARRIER	MFG.	6L-63			MODEL	942286			SERIAL NO.
240	VOLTS		AMPS	3	PH	60	HZ	50	CAPACITY (TONS)	
TOWER		MFG.	4431			MODEL				1 # OF FANS
	VOLTS		AMPS		PH		HZ	5	HP	
DTW PUMP		MFG.				MODEL				SERIAL NO.
	VOLTS		AMPS		PH		HZ		HP	
CNW PUMP		MFG.				MODEL				SERIAL NO.
	VOLTS		AMPS		PH		HZ		HP	

COMMENTS:

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENT			
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?			
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	NO TIMECLOCK			
REQUIRED START TIME	0	700	700	700	700	700	0				
REQUIRED STOP TIME	0	1700	1700	1700	1700	1700	0				
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
0	0	0	0	1	1	1	1	1	0	0	0

CONTROLS:

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
SETPOINTS		CWS (oF)		CWR (oF)		CNWS (oF)		CNWR (oF)	
PANEL INDICATORS									
- PRESSURE		LITE-HI		LITE-LOW		GAUGES			
- TEMPERATURE		LITE-HI		LITE-LOW		GAUGES			
- OTHER									

COMMENTS:

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 498

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 498CH4

REFRIGERATION EQUIPMENT SURVEY OBSERVATIONS

ACCU-4	CHILLER/COMPRESSOR NO.	OUTSIDE MER	LOCATION (RM)

UNIT TYPE:

	CENTRIFUGAL WITH WATER SIDE COOLING TOWER		OTHER
	RECIPROCATING WITH WATER SIDE COOLING TOWER	X	AHU'S SERVED AHU-4
	RECIPROCATING WITH AIR COOLED CONDENSING UNIT		
	ABSORPTION WITH WATER SIDE COOLING TOWER		
X	AIR COOLED CONDENSING UNIT		
	CHW	X	DX
			OTHER

NAMEPLATE:

CHILLER	BOHN	MFG.	CSB-15H1 BK	MODEL		SERIAL NO.
208	VOLTS		AMPS	3	PH	60
						15
CONDENSER FANS	MFG.		MODEL			3
	VOLTS		AMPS		PH	0.75
						HP
DTW PUMP	MFG.		MODEL			SERIAL NO.
	VOLTS		AMPS		PH	
						HP
CNW PUMP	MFG.		MODEL			SERIAL NO.
	VOLTS		AMPS		PH	
						HP

COMMENTS:

OPERATION:

HOURS ON:		S	M	T	W	T	F	S	COMMENT		
PRESENT START TIME		0	0	0	0	0	0	0	TIMECLOCK?		
PRESENT STOP TIME		2400	2400	2400	2400	2400	2400	2400	NO TIMECLOCK		
REQUIRED START TIME		0	700	700	700	700	700	0			
REQUIRED STOP TIME		0	1700	1700	1700	1700	1700	0			
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
0	0	0	0	1	1	1	1	1	0	0	0

CONTROLS:

	PNEUMATIC	X	ELECTRIC	ELEC'NIC	DDC	COMMENTS
SETPOINTS	CWS (oF)		CWR (oF)	CNWS (oF)	CNWR (oF)	
PANEL INDICATORS						
- PRESSURE	LITE-HI		LITE-LOW	GAUGES		
- TEMPERATURE	LITE-HI		LITE-LOW	GAUGES		
- OTHER						
COMMENTS:						

COMMENTS:

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
SETPOINTS		PSIG		HW SUPPLY					
RESET CONTROL (oF)	N	HW HIGH	N	HW LOW	N	OA LOW	N	OA HIGH	
BURNER CONTROLS		O2 TRIM (Y/N)		OTHER					
COMMENTS:									

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 498

EMC NO.: #3204.000

DATE: Mar-93

PREPARED BY: **AJN**

CHECKED BY: CEL

FILE: 498BLR3

BOILER & CONVERTER SURVEY OBSERVATIONS

BLR-3	BOILER/CONVERTER NO.	MECH. RM.	LOCATION (RM)
	SOURCE OF HEATING (PLANT)	OFFICES & MAIN STORE	SERVES AREA

UNIT TYPE:

	STEAM		PSIG	X	HW		TEMP.		BOILER TYPE:
	NO.2 OIL		NO.6 OIL	X	PROPANE		ELEC		FUELS:
	STM/HW		HTHW/HW		HTHW/STM		OTHER		CONVERTER TYPE:
X	SPACE HEAT		DHW		OTHER				USE:
COMMENT: SERVES AHU-1 & AHU-3							0.0%	% HTG AREA SERVED	
								BB RADIATION ONLY	

NAMEPLATE:

PEERLESS		MFG.	G-TOSFDA-WUP	MODEL	1228000	CAPACITY OUTPUT (BTUH)
					1535000	CAPACITY INPUT (BTUH)
		MFG.		MODEL		CAPACITY OUTPUT (BTUH)
						CAPACITY INPUT (BTUH)
0.5	HW PUMP 1 – HP			MFG.		MODEL
	HW PUMP 2 – HP			MFG.		MODEL
	HW PUMP 3 – HP			MFG.		MODEL
COMMENT:						

OPERATION:

HOURS ON:		S	M	T	W	T	F	S	COMMENT		
PRESENT START TIME		0	0	0	0	0	0	0	TIMECLOCK?		
PRESENT STOP TIME		2400	2400	2400	2400	2400	2400	2400			
REQUIRED START TIME		0	700	700	700	700	700	0			
REQUIRED STOP TIME		0	1700	1700	1700	1700	1700	0			
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	0	0	0	0	0	1	1	1

CONTROLS:

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
SETPOINTS		PSIG		HW SUPPLY					
RESET CONTROL (oF)	N	HW HIGH	N	HW LOW	N	OA LOW	N	OA HIGH	
BURNER CONTROLS		O2 TRIM (Y/N)		OTHER					
COMMENTS:									

FIELD SURVEY NOTES

BUILDING 604

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD

BLDG: 604

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: BHS

CHECKED BY: CEL

FILE: 604BLG

VI. BUILDING DATA SURVEY OBSERVATIONSBLDG NO: 604 BLDG NAME: WALLACE POOL

ZONE NO.	1	FUNCTION: POOL						
OCCUPANCY HOURS:	M-F	1230	TO	1900	SAT	1100	TO	1900
	SUN	1100	TO	1900				
PRESENT TEMP	WINTER OCC		°F	UNOCC		°F		
	SUMMER OCC		°F	UNOCC		°F		

ZONE NO.		FUNCTION:						
OCCUPANCY HOURS:	M-F		TO		SAT		TO	
	SUN		TO					
PRESENT TEMP	WINTER OCC		°F	UNOCC		°F		
	SUMMER OCC		°F	UNOCC		°F		

ZONE NO.		FUNCTION:						
OCCUPANCY HOURS:	M-F		TO		SAT		TO	
	SUN		TO					
PRESENT TEMP	WINTER OCC		°F	UNOCC		°F		
	SUMMER OCC		°F	UNOCC		°F		

REMARKS: 30 HP POOL PUMP, 200V, 90 AMP, 3 PHASE, 60 HZ
NO NAMEPLATE ON PUMP
CHEMICAL FEEDS
FOUR FILTER TANKS, NO PRESSURE GAUGES

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 604

EMC NO.: #3204.000

DATE: Mar-93

PREPARED BY: CEL

CHECKED BY: CEL

FILE: 604PUMP

BOILER & CONVERTER SURVEY OBSERVATIONS

PUMP	BOILER/CONVERTER NO.	MER	LOCATION (RM)
NONE	SOURCE OF HEATING (PLANT)	POOL	SERVES AREA

UNIT TYPE:

STEAM	PSIG	HW	TEMP.	BOILER TYPE:
NO.2 OIL	NO.6 OIL	N.GAS	ELEC	FUELS:
STM/HW	HTHW/HW	HTHW/STM	X OTHER	CONVERTER TYPE:
SPACE HEAT	DHW	OTHER		USE:
COMMENT: POOL PUMP			0%	% HTG AREA SERVED
				BB RADIATION ONLY

NAMEPLATE:

MFG.	MODEL	CAPACITY OUTPUT (BTUH)
		CAPACITY INPUT (BTUH)
MFG.	MODEL	CAPACITY OUTPUT (BTUH)
		CAPACITY INPUT (BTUH)
30	HW PUMP 1 - HP	MFG. MODEL
	HW PUMP 2 - HP	MFG. MODEL
	HW PUMP 3 - HP	MFG. MODEL
COMMENT:		

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENT			
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?			
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400				
REQUIRED START TIME	0	0	0	0	0	0	0				
REQUIRED STOP TIME	2400	2400	2400	2400	2400	2400	2400				
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
				1	1	1	1	1			

CONTROLS:

	PNEUMATIC	ELECTRIC	ELEC'NIC	DDC	COMMENTS
SETPOINTS	PSIG	HW SUPPLY			NONE
RESET CONTROL (oF)	HW HIGH	HW LOW	OA LOW	OA HIGH	
BURNER CONTROLS	O2 TRIM (Y/N)	OTHER			
COMMENTS:					

FIELD SURVEY NOTES

BUILDING 625
AND TYPICAL FOR
658 & 825

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD

BLDG: 625

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: JDR

CHECKED BY: CEL

FILE: 625BLG

VI. BUILDING DATA SURVEY OBSERVATIONS

BLDG NO: 625 BLDG NAME: BAT. HQ

ZONE NO.	1	FUNCTION: ADMIN							
OCCUPANCY HOURS:		M-F	700	TO	1700	SAT	800	TO	1600
		SUN	800	TO	1600				
PRESENT TEMP	WINTER OCC	°F			UNOCC	°F			
	SUMMER OCC	°F			UNOCC	°F			

ZONE NO.	FUNCTION:								
OCCUPANCY HOURS:		M-F		TO		SAT		TO	
		SUN		TO					
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F				
	SUMMER OCC	°F		UNOCC	°F				

ZONE NO.	FUNCTION:								
OCCUPANCY HOURS:		M-F		TO		SAT		TO	
		SUN		TO					
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F				
	SUMMER OCC	°F		UNOCC	°F				

REMARKS: A. TIME CLOCK FOR AHU HAS PINS, IS WORKING
B. DAMPER ACTUATORS ARE CONNECTED AND WORKING
C. CONTROLS ARE IN OK CONDITION
D. HW LINES IN MECH ROOM ARE NOT INSULATED
E. CONDENSATE LINES AND TANKS ARE NOT INSULATED

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 625

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: DR

CHECKED BY: CEL

FILE: 625AH1

AIR HANDLING UNIT SURVEY OBSERVATIONS

AHU-1	AHU NO.	MECH. RM.	LOCATION (RM)
ACCU-1	REF. SYS. SERVING AHU	ALL	SERVES AREA

UNIT TYPE:

	SINGLE ZN	2-PIPE FC	4-PIPE FC	UNIT HTR	H&V
X	MULTIZONE	DOUBLE DT	REHEAT	INDUCTION	VAV
5	NUMBER OF ZONES	OTHER			
	COMMENT:				

NAMEPLATE:

WORTHINGTON	MFG.	CM-18.00	MODEL
7.5 SUPPLY FAN HP DAYTON	MFG.	2N985G	MODEL
RET/EXH FAN HP	MFG.		MODEL
9430 CFM-HTG 9430 CFM-CLG 17% MIN %OA 100% MAX %OA 73.5% % HTG AREA SERVED			
COMMENT:			

COILS:

X	NONE		STM		HW		ELEC		MOD VLV	PREHEAT
	NONE		STM	X	HW		ELEC	X	MOD VLV	HEATING
X	NONE		STM		HW		ELEC		MOD VLV	REHEAT
X	NONE		STM		HW		EVAP MEDIA		MOD VLV	HUMID.
	NONE	X	DX		CW			X	MOD VLV	COOLING

OPERATION:

HOURS ON:		S	M	T	W	T	F	S	COMMENTS		
PRESENT START TIME		800	700	700	700	700	700	800	TIMECLOCK?		
PRESENT STOP TIME		1600	1700	1700	1700	1700	1700	1600	YES		
REQUIRED START TIME		800	700	700	700	700	700	800			
REQUIRED STOP TIME		1600	1700	1700	1700	1700	1700	1600			
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	1	1	1	1	1	1	1	1

CONTROLS:

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			DAMPERS CONNECTED
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	& WORKING
OTHER SETPOINTS (oF):	N/A	HOT DECK	N/A	COLD DECK	N/A	MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)	N	EA (Y/N)	
		MA CONTROL		ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:	Y	YES		NO					
COMMENTS:									

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 625

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: BHS

CHECKED BY: CEL

FILE: 625RD1

PERIMETER RADIATION SURVEY OBSERVATIONS

RAD-1	PER RAD NO.	MECH. RM.	LOCATION (RM)
	SOURCE OF HEATING	ALL	SERVES AREA

UNIT TYPE:

STEAM	X	HW	ELECTRIC
OTHER			
COMMENT:			

NAMEPLATE:

HW PUMP 1 - HP	MFG.	MODEL
HW PUMP 2 - HP	MFG.	MODEL
HW PUMP 3 - HP	MFG.	MODEL
HW PUMP 4 - HP	MFG.	MODEL
COMMENT:	26.5%	% AREA HEATING

OPERATION:

HOURS ON:		S	M	T	W	T	F	S	COMMENT		
PRESENT START TIME		0	0	0	0	0	0	0	TIMECLOCK?		
PRESENT STOP TIME		2400	2400	2400	2400	2400	2400	2400	NO		
REQUIRED START TIME		800	700	700	700	700	700	800			
REQUIRED STOP TIME		1600	1700	1700	1700	1700	1700	1600			
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	0	0	0	0	0	0	1	1	1

CONTROLS:

	PNEUMATIC	ELECTRIC	ELEC'NIC	DDC	COMMENTS
RADIATION CONTROL	X	NONE	2-WAY VLV	3-WAY VLV	OTHER
SPACE SETPOINT (oF):	OCC HEAT	UNOCC HEAT	OCC COOL	UNOCC COOL	
RESET CONTROL (oF):	HW HIGH	HW LOW	OA LOW	OA HIGH	
COMMENTS:					

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 625

EMC NO.: #3204.000

DATE: Mar-93

PREPARED BY: DR

CHECKED BY: CEL

FILE: 625CV1

BOILER & CONVERTER SURVEY OBSERVATIONS

CV-1	BOILER/CONVERTER NO.	MECH. RM.	LOCATION (RM)
C.P.	SOURCE OF HEATING (PLANT)	ALL	SERVES AREA

UNIT TYPE:

	STEAM		PSIG		HW		TEMP.		BOILER TYPE:
	NO.2 OIL		NO.6 OIL		N.GAS		ELEC		FUELS:
X	STM/HW		HTHW/HW		HTHW/STM		OTHER		CONVERTER TYPE:
X	SPACE HEAT		DHW		OTHER				USE:
COMMENT:								% HTG AREA SERVED	
								BB RADIATION ONLY	

NAMEPLATE:

N/A		MFG.	N/A	MODEL	290000	CAPACITY OUTPUT (BTUH)
					305263	CAPACITY INPUT (BTUH)
		MFG.		MODEL		CAPACITY OUTPUT (BTUH)
						CAPACITY INPUT (BTUH)
0.75	HW PUMP 1 – HP	DUNHAM – BUSH		MFG.	1A5C431 – 2	MODEL
	HW PUMP 2 – HP			MFG.		MODEL
	HW PUMP 3 – HP			MFG.		MODEL
COMMENT:						

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENT			
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?			
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	NO			
REQUIRED START TIME	800	700	700	700	700	700	800				
REQUIRED STOP TIME	1600	1700	1700	1700	1700	1700	1600				
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	0	0	0	0	0	0	1	1	1

CONTROLS:

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
SETPOINTS		PSIG	N/A	HW SUPPLY					
RESET CONTROL (oF)		HW HIGH		HW LOW		OA LOW		OA HIGH	
BURNER CONTROLS		O2 TRIM (Y/N)		OTHER					
COMMENTS:									

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 625

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: DR

CHECKED BY: CEL

FILE: 625CH1

REFRIGERATION EQUIPMENT SURVEY OBSERVATIONS

CH-1	CHILLER/COMPRESSOR NO.	OUTSIDE MECH. RM.	LOCATION (RM)

UNIT TYPE:

	CENTRIFUGAL WITH WATER SIDE COOLING TOWER		OTHER
	RECIPROCATING WITH WATER SIDE COOLING TOWER	AHU-1	AHU'S SERVED
	RECIPROCATING WITH AIR COOLED CONDENSING UNIT		
	ABSORPTION WITH WATER SIDE COOLING TOWER		
X	AIR COOLED CONDENSING UNIT		
	CHW	X	DX
			OTHER

NAMEPLATE:

CHILLER/WEATHER K	MFG.	4172-2-40B	MODEL	18211203541	SERIAL NO.
230	VOLTS	140	AMPS	3	PH
60	HZ	30	CAPACITY (TONS)		
TOWER	MFG.		MODEL	2	# OF FANS
230	VOLTS	8.4	AMPS	3	PH
60	HZ	3	HP each		
CW PUMP	MFG.		MODEL		SERIAL NO.
	VOLTS		AMPS		PH
			HZ		HP
CW PUMP	MFG.		MODEL		SERIAL NO.
	VOLTS		AMPS		PH
			HZ		HP

COMMENTS:

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENT
PRESENT START TIME	800	700	700	700	700	700	800	TIMECLOCK?
PRESENT STOP TIME	1600	1700	1700	1700	1700	1700	1600	YES
REQUIRED START TIME	800	700	700	700	700	700	800	
REQUIRED STOP TIME	1600	1700	1700	1700	1700	1700	1600	
MONTHS ON:								
J	F	M	A	M	J	J	A	S
0	0	0	0	1	1	1	1	1

CONTROLS:

	PNEUMATIC	ELECTRIC	ELEC'NIC	DDC	COMMENTS
SETPOINTS	CWS (oF)	CWR (oF)	CNWS (oF)	CNWR (oF)	
PANEL INDICATORS					
- PRESSURE	LITE-HI	LITE-LOW	GAUGES		
- TEMPERATURE	LITE-HI	LITE-LOW	GAUGES		
- OTHER					

COMMENTS:

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY
CLIENT CONTRACT NO.: DACA 41-92-C-0098
CLIENT PROJ. ENG: DOUG CAGE
LOCATION: FT. LEONARD WOOD BLDG: 625

DATE: Mar-93
PREPARED BY: DR
CHECKED BY: CEL
FILE: 625DHW

DOMESTIC HW SURVEY OBSERVATIONS			
DHW-1	BOILER/CONVERTER NO.	MER	LOCATION (RM)
ELEC	SOURCE OF HEATING (PLANT)	ALL	SERVES AREA

UNIT TYPE:									
	NO.2 OIL		NO.6 OIL		N.GAS	X	ELEC		FUELS:
	STM/HW		HTHW/HW		HTHW/STM		OTHER		CONVERTER TYPE:
COMMENT:									

NAMEPLATE:					
MFG.		MODEL		1.65	CAPACITY OUTPUT (BTUH,KW)
MFG.		MODEL			CAPACITY OUTPUT (BTUH,KW)
DOMESTIC HW CIRCULATION PUMP:					
HW PUMP 1 – HP			MFG.		MODEL
HW PUMP 2 – HP			MFG.		MODEL
HW PUMP 3 – HP			MFG.		MODEL
COMMENT:					

DIMENSION:	14	DIAMETER (INCHS)	18	HEIGHT OR LENGTH (INCHES)	6 GALLON
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[illegible]

CONTROLS:									
		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
SETPOINTS				HW SUPPLY					
COMMENTS:									

FIELD SURVEY NOTES

BUILDING 627
AND TYPICAL FOR
628, 629, 634, 635, 651
652, 654, 659, AND 660

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD

BLDG: 627

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 627BLG

VI. BUILDING DATA SURVEY OBSERVATIONS

BLDG NO: 627 BLDG NAME: BARRACKS WITH A/C

ZONE NO.	1	FUNCTION: QUARTERS						
OCCUPANCY HOURS:	M-F	0	TO	2400	SAT	0	TO	2400
	SUN	0	TO	2400				
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F			
	SUMMER OCC	°F		UNOCC	°F			

ZONE NO.	FUNCTION:							
OCCUPANCY HOURS:	M-F		TO		SAT		TO	
	SUN		TO					
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F			
	SUMMER OCC	°F		UNOCC	°F			

ZONE NO.	FUNCTION:							
OCCUPANCY HOURS:	M-F		TO		SAT		TO	
	SUN		TO					
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F			
	SUMMER OCC	°F		UNOCC	°F			

REMARKS: AHU CONTROLS ARE PNEUMATIC AND IN GOOD CONDITION
TIME CLOCK IS PRESENT, BUT PINS ARE MISSING
THREE ZONES FOR HW BASEBOARD HEATING

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 627

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: CEL

CHECKED BY: CEL

FILE: 627VAV1

AIR HANDLING UNIT SURVEY OBSERVATIONS

VAV-1	AHU NO.	MER	LOCATION (RM)
C.PLANT	REF. SYS. SERVING AHU	SOUTH	SERVES AREA

UNIT TYPE:

SINGLE ZN	2-PIPE FC	4-PIPE FC	UNIT HTR	H&V
MULTIZONE	DOUBLE DT	REHEAT	INDUCTION	X VAV
NUMBER OF ZONES	45	OTHER	VAV BOXES	
COMMENT:				

NAMEPLATE:

					MFG.					MODEL
15.0	SUPPLY FAN HP		MARATHON		MFG.	DD254TTDR7343CCW				MODEL
3.0	RET/EXH FAN HP		RELIANCE		MFG.	P18K13AMZ				MODEL
13574	CFM-HTG	13547	CFM-CLG	10%	MIN %OA	100%	MAX %OA	0.0%	% HTG AREA SERVED	
COMMENT:										

COILS:

X	NONE	STM	HW	ELEC	MOD VLV	PREHEAT
X	NONE	STM	HW	ELEC	MOD VLV	HEATING
X	NONE	STM	HW	ELEC	MOD VLV	REHEAT
X	NONE	STM	HW	EVAP MEDIA	MOD VLV	HUMID.
	NONE	DX	X CW		MOD VLV	COOLING

OPERATION:

HOURS ON:			S	M	T	W	T	F	S	COMMENTS		
PRESENT START TIME			0	0	0	0	0	0	0	TIMECLOCK?		
PRESENT STOP TIME			2400	2400	2400	2400	2400	2400	2400	YES		
REQUIRED START TIME			0	0	0	0	0	0	0	NO PINS IN TC		
REQUIRED STOP TIME			2400	2400	2400	2400	2400	2400	2400			
MONTHS ON:												
J	F	M	A	M	J	J	A	S	O	N	D	
				1	1	1	1	1				

CONTROLS:

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:	X	SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (°F):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (°F):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)	N	EA (Y/N)	
		MA CONTROL		ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:		YES		NO					
COMMENTS: MANUAL OA DAMPER POSITION, LINKAGE GOOD									

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 627

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: CEL

CHECKED BY: CEL

FILE: 627VAV2

AIR HANDLING UNIT SURVEY OBSERVATIONS

VAV-2	AHU NO.	MER	LOCATION (RM)
C.PLANT	REF. SYS. SERVING AHU	NORTH	SERVES AREA

UNIT TYPE:

SINGLE ZN	2-PIPE FC	4-PIPE FC	UNIT HTR	H&V
MULTIZONE	DOUBLE DT	REHEAT	INDUCTION	X VAV
NUMBER OF ZONES	45	OTHER	VAV BOXES	
COMMENT:				

NAMEPLATE:

					MFG.					MODEL
15.0	SUPPLY FAN HP		MARATHON		MFG.	DD254TTDR7343CCW				MODEL
3.0	RET/EXH FAN HP		RELIANCE		MFG.	P18K13AMZ				MODEL
13574	CFM-HTG	13547	CFM-CLG	10%	MIN %OA	100%	MAX %OA	0.0%	% HTG AREA SERVED	
COMMENT:										

COILS:

X	NONE	STM	HW	ELEC	MOD VLV	PREHEAT
X	NONE	STM	HW	ELEC	MOD VLV	HEATING
X	NONE	STM	HW	ELEC	MOD VLV	REHEAT
X	NONE	STM	HW	EVAP MEDIA	MOD VLV	HUMID.
	NONE	DX	X	CW	MOD VLV	COOLING

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENTS			
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?			
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	YES			
REQUIRED START TIME	0	0	0	0	0	0	0	NO PINS IN TC			
REQUIRED STOP TIME	2400	2400	2400	2400	2400	2400	2400				
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
				1	1	1	1	1			

CONTROLS:

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:	X	SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (°F):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (°F):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)	N	EA (Y/N)	
		MA CONTROL		ECONO – DB		ECONO – ENT		OTHER	
DEMAND LIMIT:		YES		NO					
COMMENTS: MANUAL OA DAMPER POSITION, LINKAGE GOOD									

FILE: 627CV1

CONTROLS:									
	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
SETPOINTS		PSIG		HW SUPPLY					
RESET CONTROL (oF)	160	HW HIGH	80	HW LOW	65	OA LOW	0	OA HIGH	
BURNER CONTROLS		O2 TRIM (Y/N)		OTHER					
COMMENTS: CONTROLS IN GOOD CONDITION									

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 627

EMC NO.: #3204.000

DATE: Mar-93

PREPARED BY: **CMD**

CHECKED BY: CEL

FILE: 627CV2

BOILER & CONVERTER SURVEY OBSERVATIONS

CV-2	BOILER/CONVERTER NO.	MER	LOCATION (RM)
C. PLANT	SOURCE OF HEATING (PLANT)	ALL	SERVES AREA

UNIT TYPE:

	STEAM		PSIG		HW		TEMP.		BOILER TYPE:
	NO.2 OIL		NO.6 OIL		N.GAS		ELEC		FUELS:
X	STM/HW		HTHW/HW		HTHW/STM		OTHER		CONVERTER TYPE:
X	SPACE HEAT		DHW		OTHER				USE:
COMMENT:							0%	% HTG AREA SERVED	
								BB RADIATION ONLY	

NAMEPLATE:

DANHAM – BUSH		MFG.	SCA – 82	MODEL	933000	CAPACITY OUTPUT (BTUH)
					933000	CAPACITY INPUT (BTUH)
		MFG.		MODEL		CAPACITY OUTPUT (BTUH)
						CAPACITY INPUT (BTUH)
0.75	HW PUMP 1 – HP	GE		MFG.	5K43GG3265	MODEL
	HW PUMP 2 – HP			MFG.		MODEL
	HW PUMP 3 – HP			MFG.		MODEL
COMMENT:						

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENT			
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?			
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	YES – NO PINS			
REQUIRED START TIME	0	0	0	0	0	0	0				
REQUIRED STOP TIME	2400	2400	2400	2400	2400	2400	2400				
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1						1	1	1

CONTROLS:

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
SETPOINTS		PSIG		HW SUPPLY					
RESET CONTROL (oF)	160	HW HIGH	80	HW LOW	65	OA LOW	0	OA HIGH	
BURNER CONTROLS		O2 TRIM (Y/N)		OTHER					
COMMENTS: CONTROLS IN GOOD CONDITION									

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY
CLIENT CONTRACT NO.: DACA 41-92-C-0098
CLIENT PROJ. ENG: DOUG CAGE
LOCATION: FT. LEONARD WOOD BLDG: **627**

EMC NO.: #3204.000

DATE: Mar-93

PREPARED BY: CMD

CHECKED BY: CEL

FILE: 627CV3

BOILER & CONVERTER SURVEY OBSERVATIONS

CV-3	BOILER/CONVERTER NO.	MER	LOCATION (RM)
C. PLANT	SOURCE OF HEATING (PLANT)	ALL	SERVES AREA

UNIT TYPE:

	STEAM		PSIG		HW		TEMP.		BOILER TYPE:
	NO.2 OIL		NO.6 OIL		N.GAS		ELEC		FUELS:
X	STM/HW		HTHW/HW		HTHW/STM		OTHER		CONVERTER TYPE:
X	SPACE HEAT		DHW		OTHER				USE:
COMMENT:							0%	% HTG AREA SERVED	
								BB RADIATION ONLY	

NAMEPLATE:

DANHAM – BUSH		MFG.	SCA – 42	MODEL	936000	CAPACITY OUTPUT (BTUH)
					936000	CAPACITY INPUT (BTUH)
		MFG.		MODEL		CAPACITY OUTPUT (BTUH)
						CAPACITY INPUT (BTUH)
0.75	HW PUMP 1 – HP	GE		MFG.		MODEL
	HW PUMP 2 – HP			MFG.		MODEL
	HW PUMP 3 – HP			MFG.		MODEL
COMMENT:						

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENT			
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?			
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	YES – NO PINS			
REQUIRED START TIME	0	0	0	0	0	0	0				
REQUIRED STOP TIME	2400	2400	2400	2400	2400	2400	2400				
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1						1	1	1

CONTROLS:

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
SETPOINTS		PSIG		HW SUPPLY					
RESET CONTROL (oF)	160	HW HIGH	80	HW LOW	65	OA LOW	0	OA HIGH	
BURNER CONTROLS		O2 TRIM (Y/N)		OTHER					
COMMENTS: CONTROLS IN GOOD CONDITION									

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 627

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: CMD

CHECKED BY: CEL

FILE: 627CWP

REFRIGERATION EQUIPMENT SURVEY OBSERVATIONS

CWP-1	CHILLER/COMPRESSOR NO.	MER	LOCATION (RM)

UNIT TYPE:

	CENTRIFUGAL WITH WATER SIDE COOLING TOWER	X	OTHER	CHW PUMP
	RECIPROCATING WITH WATER SIDE COOLING TOWER			AHU'S SERVED
	RECIPROCATING WITH AIR COOLED CONDENSING UNIT			
	ABSORPTION WITH WATER SIDE COOLING TOWER			
	AIR COOLED CONDENSING UNIT			
X	CHW		DX	OTHER

NAMEPLATE:

CHILLER	MFG.		MODEL		SERIAL NO.
	VOLTS		AMPS	PH	HZ
					CAPACITY (TONS)
TOWER	MFG.		MODEL		# OF FANS
	VOLTS		AMPS	PH	HZ
					HP each
CW PUM	MFG.	KVA145TTDR7644AEW	MODEL		SERIAL NO.
208	VOLTS	6.3	AMPS	3	PH
			60	HZ	2
					HP
CNW PUMP	MFG.		MODEL		SERIAL NO.
	VOLTS		AMPS	PH	HZ
					HP

COMMENTS:

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENT			
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?			
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400				
REQUIRED START TIME	0	0	0	0	0	0	0				
REQUIRED STOP TIME	2400	2400	2400	2400	2400	2400	2400				
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
				1	1	1	1	1			

CONTROLS:

	PNEUMATIC	ELECTRIC	ELEC'NIC	DDC	COMMENTS
SETPOINTS	CWS (oF)	CWR (oF)	CNWS (oF)	CNWR (oF)	NONE
PANEL INDICATORS					
- PRESSURE	LITE-HI	LITE-LOW	GAUGES		
- TEMPERATURE	LITE-HI	LITE-LOW	GAUGES		
- OTHER					
COMMENTS:					

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 627

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: CMD

CHECKED BY: CEL

FILE: 627RAD1

PERIMETER RADIATION SURVEY OBSERVATIONS

RAD-1	PER RAD NO.	NORTH	LOCATION (RM)
CONV-1	SOURCE OF HEATING	NORTH	SERVES AREA

UNIT TYPE:

STEAM	X	HW	ELECTRIC				
OTHER							
COMMENT:							

NAMEPLATE:

HW PUMP 1 - HP		MFG.		MODEL
HW PUMP 2 - HP		MFG.		MODEL
HW PUMP 3 - HP		MFG.		MODEL
HW PUMP 4 - HP		MFG.		MODEL
COMMENT:	SEE CONVERTER	40.0%	% AREA HEATING	

OPERATION:

HOURS ON:									S	M	T	W	T	F	S	COMMENT
PRESENT START TIME									0	0	0	0	0	0	0	TIMECLOCK?
PRESENT STOP TIME									2400	2400	2400	2400	2400	2400	2400	
REQUIRED START TIME									0	0	0	0	0	0	0	
REQUIRED STOP TIME									2400	2400	2400	2400	2400	2400	2400	
MONTHS ON:																
J	F	M	A	M	J	J	A	S	O	N	D					
1	1	1	1						1	1	1					

CONTROLS:

	PNEUMATIC	ELECTRIC	ELEC'NIC	DDC	COMMENTS
RADIATION CONTROL	NONE	2-WAY VLV	3-WAY VLV	OTHER	NO CONTROL
SPACE SETPOINT (°F):	OCC HEAT	UNOCC HEAT	OCC COOL	UNOCC COOL	
RESET CONTROL (°F):	HW HIGH	HW LOW	OA LOW	OA HIGH	
COMMENTS:					

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 627

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: CMD

CHECKED BY: CEL

FILE: 627RAD2

PERIMETER RADIATION SURVEY OBSERVATIONS

RAD-2	PER RAD NO.	NORTH	LOCATION (RM)
CONV-2	SOURCE OF HEATING	NORTH	SERVES AREA

UNIT TYPE:

STEAM	X	HW	ELECTRIC				
OTHER							
COMMENT:							

NAMEPLATE:

HW PUMP 1 - HP		MFG.		MODEL
HW PUMP 2 - HP		MFG.		MODEL
HW PUMP 3 - HP		MFG.		MODEL
HW PUMP 4 - HP		MFG.		MODEL
COMMENT:	SEE CONVERTER		40.0%	% AREA HEATING

OPERATION:

HOURS ON:		S	M	T	W	T	F	S	COMMENT		
PRESENT START TIME		0	0	0	0	0	0	0	TIMECLOCK?		
PRESENT STOP TIME		2400	2400	2400	2400	2400	2400	2400			
REQUIRED START TIME		0	0	0	0	0	0	0			
REQUIRED STOP TIME		2400	2400	2400	2400	2400	2400	2400			
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1						1	1	1

CONTROLS:

	PNEUMATIC	ELECTRIC	ELEC'NIC	DDC	COMMENTS
RADIATION CONTROL	NONE	2-WAY VLV	3-WAY VLV	OTHER	NO CONTROL
SPACE SETPOINT (°F):	OCC HEAT	UNOCC HEAT	OCC COOL	UNOCC COOL	
RESET CONTROL (°F):	HW HIGH	HW LOW	OA LOW	OA HIGH	
COMMENTS:					

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 627

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: CMD

CHECKED BY: CEL

FILE: 627RAD3

PERIMETER RADIATION SURVEY OBSERVATIONS

RAD-3	PER RAD NO.	OTHER	LOCATION (RM)
CONV-3	SOURCE OF HEATING	OTHER	SERVES AREA

UNIT TYPE:

STEAM	X	HW	ELECTRIC				
OTHER							
COMMENT:							

NAMEPLATE:

HW PUMP 1 - HP		MFG.		MODEL
HW PUMP 2 - HP		MFG.		MODEL
HW PUMP 3 - HP		MFG.		MODEL
HW PUMP 4 - HP		MFG.		MODEL
COMMENT:	SEE CONVERTER	20.0%	% AREA HEATING	

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENT			
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?			
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400				
REQUIRED START TIME	0	0	0	0	0	0	0				
REQUIRED STOP TIME	2400	2400	2400	2400	2400	2400	2400				
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1						1	1	1

CONTROLS:

	PNEUMATIC	ELECTRIC	ELEC'NIC	DDC	COMMENTS
RADIATION CONTROL:	NONE	2-WAY VLV	3-WAY VLV	OTHER	NO CONTROL
SPACE SETPOINT (°F):	OCC HEAT	UNOCC HEAT	OCC COOL	UNOCC COOL	
RESET CONTROL (°F):	HW HIGH	HW LOW	OA LOW	OA HIGH	
COMMENTS:					

FIELD SURVEY NOTES

BUILDING 673
AND TYPICAL FOR
672, 680, 681, 772, 773,
780, 781, 872, 873, 880,
881, 990, 991, 998, AND 999

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD

BLDG: 673

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 673BLG

VI. BUILDING DATA SURVEY OBSERVATIONS

BLDG NO: 673 BLDG NAME: MOTOR POOL

ZONE NO.	1	FUNCTION: VEHICLE MAINTENANCE						
OCCUPANCY HOURS:	M – F	700	TO	1700	SAT	0	TO	0
	SUN	0	TO	0				
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F			
	SUMMER OCC	°F		UNOCC	°F			

ZONE NO.		FUNCTION:						
OCCUPANCY HOURS:	M-F		TO		SAT		TO	
	SUN		TO					
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F			
	SUMMER OCC	°F		UNOCC	°F			

ZONE NO.		FUNCTION:							
OCCUPANCY HOURS:		M—F		TO		SAT		TO	
		SUN		TO					
PRESENT TEMP	WINTER OCC		°F		UNOCC	°F			
	SUMMER OCC		°F		UNOCC	°F			

REMARKS: TWO OIL-FIRED FORCED AIR FURNANCES
ELECTRIC CONTROLS

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 673

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: DR

CHECKED BY: CEL

FILE: 673UH1

AIR HANDLING UNIT SURVEY OBSERVATIONS

UH-1	AHU NO.	EAST	LOCATION (RM)
NONE	REF. SYS. SERVING AHU	EAST	SERVES AREA

UNIT TYPE:

SINGLE ZN	2-PIPE FC	4-PIPE FC	X	UNIT HTR	H&V
MULTIZONE	DOUBLE DT	REHEAT		INDUCTION	VAV
NUMBER OF ZONES	OTHER				
COMMENT:					

NAMEPLATE:

FORCED AIR FURNACE					MFG.	CA-25					MODEL
1.5	SUPPLY FAN HP				MFG.						MODEL
	RET/EXH FAN HP				MFG.						MODEL
2200	CFM-HTG	0	CFM-CLG	0%	MIN %OA	0%	MAX %OA	50%	% HTG AREA SERVED		
COMMENT:											

COILS:

NONE	STM	HW	ELEC	MOD VLV	PREHEAT
NONE	X FUEL OIL	HW	ELEC	MOD VLV	HEATING
NONE	STM	HW	ELEC	MOD VLV	REHEAT
NONE	STM	HW	EVAP MEDIA	MOD VLV	HUMID.
NONE	DX	CW		MOD VLV	COOLING

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENTS
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	NO
REQUIRED START TIME	0	700	700	700	700	700	0	
REQUIRED STOP TIME	0	1700	1700	1700	1700	1700	0	

MONTHS ON:

J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1						1	1	1

CONTROLS:

	PNEUMATIC	X	ELECTRIC	ELEC'NIC	DDC	COMMENTS
THERMOSTAT TYPE:	SINGLE STPT		DUAL SETPNT	SETBACK		
SPACE SETPOINT (°F):	74.6	OCC HEAT	UNOCC HEAT	OCC COOL	UNOCC COOL	
OTHER SETPOINTS (°F):	HOT DECK	COLD DECK	MIXED AIR	OTHER		
DAMPER CONTROL:	MIN OA (Y/N)	MAX OA (Y/N)	RA (Y/N)	EA (Y/N)		
	MA CONTROL	ECONO-DB	ECONO-ENT	OTHER		
DEMAND LIMIT:	Y	YES	NO			

COMMENTS:

FILE: 673UH2

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (°F):	74.6	OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (°F):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:		MIN OA (Y/N)		MAX OA (Y/N)		RA (Y/N)		EA (Y/N)	
		MA CONTROL		ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:	Y	YES		NO					
COMMENTS:									

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
SETPOINTS				HW SUPPLY					
COMMENTS:									

FIELD SURVEY NOTES

BUILDING 730
AND TYPICAL FOR
731, 736, 737, AND 738

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD

BLDG: 730

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 730BLG

VI. BUILDING DATA SURVEY OBSERVATIONS

BLDG NO: 730 BLDG NAME: BARRACKS WITHOUT A/C

ZONE NO.	1	FUNCTION: QUARTERS						
OCCUPANCY HOURS:	M—F	0	TO	2400	SAT	0	TO	2400
	SUN	0	TO	2400				
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F			
	SUMMER OCC	°F		UNOCC	°F			

ZONE NO.		FUNCTION:						
OCCUPANCY HOURS:	M – F		TO		SAT		TO	
	SUN		TO					
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F			
	SUMMER OCC	°F		UNOCC	°F			

ZONE NO.		FUNCTION:							
OCCUPANCY HOURS:		M – F		TO		SAT		TO	
		SUN		TO					
PRESENT TEMP	WINTER OCC		°F		UNOCC	°F			
	SUMMER OCC		°F		UNOCC	°F			

REMARKS: PNEUMATIC CONTROLS; TIMECLOCK PRESENT, BUT HAS NO PINS
TWO ZONES FOR HW BASEBOARD HEATING
TWO LARGE EXHAUST FANS FOR VENTILATION

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 730

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: CMD

CHECKED BY: CEL

FILE: 730RAD1

PERIMETER RADIATION SURVEY OBSERVATIONS

RAD-1	PER RAD NO.	NORTH	LOCATION (RM)
CONV-1	SOURCE OF HEATING	NORTH	SERVES AREA

UNIT TYPE:

STEAM	X	HW	ELECTRIC				
OTHER							
COMMENT:							

NAMEPLATE:

HW PUMP 1 - HP		MFG.		MODEL
HW PUMP 2 - HP		MFG.		MODEL
HW PUMP 3 - HP		MFG.		MODEL
HW PUMP 4 - HP		MFG.		MODEL
COMMENT:	SEE CONVERTER	50.0%	% AREA HEATING	

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENT			
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?			
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400				
REQUIRED START TIME	0	0	0	0	0	0	0				
REQUIRED STOP TIME	2400	2400	2400	2400	2400	2400	2400				
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1						1	1	1

CONTROLS:

	PNEUMATIC	ELECTRIC	ELEC'NIC	DDC	COMMENTS
RADIATION CONTROL	NONE	2-WAY VLV	3-WAY VLV	OTHER	NO CONTROL
SPACE SETPOINT (°F):	OCC HEAT	UNOCC HEAT	OCC COOL	UNOCC COOL	
RESET CONTROL (°F):	HW HIGH	HW LOW	OA LOW	OA HIGH	
COMMENTS:					

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 730

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: CMD

CHECKED BY: CEL

FILE: 730RAD2

PERIMETER RADIATION SURVEY OBSERVATIONS

RAD-2	PER RAD NO.	NORTH	LOCATION (RM)
CONV-2	SOURCE OF HEATING	NORTH	SERVES AREA

UNIT TYPE:

STEAM	X	HW	ELECTRIC				
OTHER							
COMMENT:							

NAMEPLATE:

HW PUMP 1 - HP		MFG.		MODEL
HW PUMP 2 - HP		MFG.		MODEL
HW PUMP 3 - HP		MFG.		MODEL
HW PUMP 4 - HP		MFG.		MODEL
COMMENT:	SEE CONVERTER	50.0%	% AREA HEATING	

OPERATION:

HOURS ON:		S	M	T	W	T	F	S	COMMENT		
PRESENT START TIME		0	0	0	0	0	0	0	TIMECLOCK?		
PRESENT STOP TIME		2400	2400	2400	2400	2400	2400	2400			
REQUIRED START TIME		0	0	0	0	0	0	0			
REQUIRED STOP TIME		2400	2400	2400	2400	2400	2400	2400			
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1						1	1	1

CONTROLS:

	PNEUMATIC	ELECTRIC	ELEC'NIC	DDC	COMMENTS
RADIATION CONTROL:	NONE	2-WAY VLV	3-WAY VLV	OTHER	NO CONTROL
SPACE SETPOINT (°F):	OCC HEAT	UNOCC HEAT	OCC COOL	UNOCC COOL	
RESET CONTROL (°F):	HW HIGH	HW LOW	OA LOW	OA HIGH	
COMMENTS:					

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY
CLIENT CONTRACT NO.: DACA 41-92-C-0098
CLIENT PROJ. ENG: DOUG CAGE
LOCATION: FT. LEONARD WOOD BLDG: 730

DATE: Mar-93
PREPARED BY: CMD
CHECKED BY: CEL
FILE: 730CV1

LOCATION: FT. LEONARD WOOD				BLDG: 730		FILE: 73001	
BOILER & CONVERTER SURVEY OBSERVATIONS							
CV-1	BOILER/CONVERTER NO.		MER		LOCATION (RM)		
C. PLANT	SOURCE OF HEATING (PLANT)		ALL		SERVES AREA		

UNIT TYPE:									
	STEAM		PSIG		HW		TEMP.		BOILER TYPE:
	NO.2 OIL		NO.6 OIL		N.GAS		ELEC		FUELS:
X	STM/HW		HTHW/HW		HTHW/STM		OTHER		CONVERTER TYPE:
X	SPACE HEAT		DHW		OTHER				USE:
COMMENT:							0%	% HTG AREA SERVED	
								BB RADIATION ONLY	

NAMEPLATE:					
	MFG.		MODEL	936000	CAPACITY OUTPUT (BTUH)
				936000	CAPACITY INPUT (BTUH)
	MFG.		MODEL		CAPACITY OUTPUT (BTUH)
					CAPACITY INPUT (BTUH)
0.75	HW PUMP 1 – HP	BALDOR	MFG.	JM3463	MODEL
	HW PUMP 2 – HP		MFG.		MODEL
	HW PUMP 3 – HP		MFG.		MODEL
COMMENT:					

OPERATION:											
HOURS ON:		S	M	T	W	T	F	S	COMMENT		
PRESENT START TIME		0	0	0	0	0	0	0	TIMECLOCK?		
PRESENT STOP TIME		2400	2400	2400	2400	2400	2400	2400			
REQUIRED START TIME		0	0	0	0	0	0	0			
REQUIRED STOP TIME		2400	2400	2400	2400	2400	2400	2400			
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1						1	1	1

CONTROLS:									
	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
SETPOINTS		PSIG		HW SUPPLY					
RESET CONTROL (oF)	160	HW HIGH	80	HW LOW	65	OA LOW	0	OA HIGH	
BURNER CONTROLS		O2 TRIM (Y/N)		OTHER					
COMMENTS:									

	X	PNEUMATIC	ELECTRIC	ELEC'NIC	DDC	COMMENTS
SETPOINTS		PSIG	HW SUPPLY			
RESET CONTROL (oF)	160	HW HIGH	80 HW LOW	65 OA LOW	0 OA HIGH	
BURNER CONTROLS		O2 TRIM (Y/N)	OTHER			
COMMENTS:						

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 730

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: CMD

CHECKED BY: CEL

FILE: 730EX1

AIR HANDLING UNIT SURVEY OBSERVATIONS

EX-1	AHU NO.	MER	LOCATION (RM)
NONE	REF. SYS. SERVING AHU	ALL	SERVES AREA

UNIT TYPE:

	SINGLE ZN		2-PIPE FC		4-PIPE FC		UNIT HTR		H&V
	MULTIZONE		DOUBLE DT		REHEAT		INDUCTION		VAV
	NUMBER OF ZONES	X			OTHER	VENT FAN FOR BLDG			
	COMMENT:								

NAMEPLATE:

					MFG.					MODEL
	SUPPLY FAN HP				MFG.					MODEL
20.0	RET/EXH FAN HP		CENTURY		MFG.	SC-286U-FC5-5				MODEL
0	CFM-HTG	0	CFM-CLG	0%	MIN %OA	0%	MAX %OA	0.0%	% HTG AREA SERVED	
COMMENT:										

COILS:

X	NONE	STM	HW	ELEC	MOD VLV	PREHEAT
X	NONE	STM	HW	ELEC	MOD VLV	HEATING
X	NONE	STM	HW	ELEC	MOD VLV	REHEAT
X	NONE	STM	HW	EVAP MEDIA	MOD VLV	HUMID.
X	NONE	DX	CW		MOD VLV	COOLING

OPERATION:

HOURS ON:		S	M	T	W	T	F	S	COMMENTS		
PRESENT START TIME		0	0	0	0	0	0	0	TIMECLOCK?		
PRESENT STOP TIME		2400	2400	2400	2400	2400	2400	2400	NO		
REQUIRED START TIME		0	0	0	0	0	0	0			
REQUIRED STOP TIME		2400	2400	2400	2400	2400	2400	2400			
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
				1	1	1	1	1			

CONTROLS:

	PNEUMATIC	ELECTRIC	ELEC'NIC	DDC	COMMENTS
THERMOSTAT TYPE:	SINGLE STPT	DUAL SETPNT	SETBACK		NONE
SPACE SETPOINT (°F):	OCC HEAT	UNOCC HEAT	OCC COOL	UNOCC COOL	
OTHER SETPOINTS (°F):	HOT DECK	COLD DECK	MIXED AIR	OTHER	
DAMPER CONTROL:	MIN OA (Y/N)	MAX OA (Y/N)	RA (Y/N)	EA (Y/N)	
	MA CONTROL	ECONO-DB	ECONO-ENT	OTHER	
DEMAND LIMIT:	X	YES	NO		
COMMENTS:					

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 730

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: CMD

CHECKED BY: CEL

FILE: 730EX2

AIR HANDLING UNIT SURVEY OBSERVATIONS

EX-2	AHU NO.	MER	LOCATION (RM)
NONE	REF. SYS. SERVING AHU	ALL	SERVES AREA

UNIT TYPE:

	SINGLE ZN		2-PIPE FC		4-PIPE FC		UNIT HTR		H&V
	MULTIZONE		DOUBLE DT		REHEAT		INDUCTION		VAV
	NUMBER OF ZONES	X			OTHER	VENT FAN FOR BLDG			
	COMMENT:								

NAMEPLATE:

					MFG.					MODEL
	SUPPLY FAN HP				MFG.					MODEL
20.0	RET/EXH FAN HP		CENTURY		MFG.	SC-286U-FC5-5				MODEL
0	CFM-HTG	0	CFM-CLG	0%	MIN %OA	0%	MAX %OA	0.0%	% HTG AREA SERVED	
COMMENT:										

COILS:

X	NONE	STM	HW	ELEC	MOD VLV	PREHEAT
X	NONE	STM	HW	ELEC	MOD VLV	HEATING
X	NONE	STM	HW	ELEC	MOD VLV	REHEAT
X	NONE	STM	HW	EVAP MEDIA	MOD VLV	HUMID.
X	NONE	DX	CW		MOD VLV	COOLING

OPERATION:

HOURS ON:		S	M	T	W	T	F	S	COMMENTS		
PRESENT START TIME		0	0	0	0	0	0	0	TIMECLOCK?		
PRESENT STOP TIME		2400	2400	2400	2400	2400	2400	2400	NO		
REQUIRED START TIME		0	0	0	0	0	0	0			
REQUIRED STOP TIME		2400	2400	2400	2400	2400	2400	2400			
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
				1	1	1	1	1			

CONTROLS:

	PNEUMATIC	ELECTRIC	ELEC'NIC	DDC	COMMENTS
THERMOSTAT TYPE:	SINGLE STPT	DUAL SETPNT	SETBACK		NONE
SPACE SETPOINT (°F):	OCC HEAT	UNOCC HEAT	OCC COOL	UNOCC COOL	
OTHER SETPOINTS (°F):	HOT DECK	COLD DECK	MIXED AIR	OTHER	
DAMPER CONTROL:	MIN OA (Y/N)	MAX OA (Y/N)	RA (Y/N)	EA (Y/N)	
	MA CONTROL	ECONO-DB	ECONO-ENT	OTHER	
DEMAND LIMIT:	X	YES	NO		
COMMENTS:					

FIELD SURVEY NOTES

BUILDINGS 735 & 739
SAME AS BUILDING 630,
WITH 3 ADDITIONAL H&Vs

FILE: 735HV3

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:		MIN OA (Y/N)		MAX OA (Y/N)		RA (Y/N)		EA (Y/N)	
		MA CONTROL		ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:		YES	X	NO					
COMMENTS:									

CONTROLS:

FILE: 735HV5

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:		MIN OA (Y/N)		MAX OA (Y/N)		RA (Y/N)		EA (Y/N)	
		MA CONTROL		ECONO – DB		ECONO – ENT		OTHER	
DEMAND LIMIT:		YES	X	NO					
COMMENTS:									

FIELD SURVEY NOTES

BUILDING 768

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD

BLDG: 768

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 768BLG

VI. BUILDING DATA SURVEY OBSERVATIONS

BLDG NO: 768 BLDG NAME: KANELL HALL

ZONE NO.	1	FUNCTION: CLASSROOMS					
OCCUPANCY HOURS:	M-F	500	TO	2200	SAT	500	TO 2200
	SUN	500	TO	2200			
PRESENT TEMP	WINTER OCC		°F	UNOCC	°F		
	SUMMER OCC		°F	UNOCC	°F		

ZONE NO.		FUNCTION:					
OCCUPANCY HOURS:	M-F		TO		SAT		TO
	SUN		TO				
PRESENT TEMP	WINTER OCC		°F	UNOCC	°F		
	SUMMER OCC		°F	UNOCC	°F		

ZONE NO.		FUNCTION:					
OCCUPANCY HOURS:	M-F		TO		SAT		TO
	SUN		TO				
PRESENT TEMP	WINTER OCC		°F	UNOCC	°F		
	SUMMER OCC		°F	UNOCC	°F		

REMARKS:

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 768

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 768AH1

AIR HANDLING UNIT SURVEY OBSERVATIONS

AHU-1	AHU NO.	ABOVE RESTROOM CEILING	LOCATION (RM)
ACCU-1	REF. SYS. SERVING AHU	ALL	SERVES AREA

UNIT TYPE:

X	SINGLE ZN	2-PIPE FC	4-PIPE FC	UNIT HTR	H&V
	MULTIZONE	DOUBLE DT	REHEAT	INDUCTION	VAV
	NUMBER OF ZONES	OTHER			
	COMMENT:				

NAMEPLATE:

TRANE					MFG.					MODEL
5.0	SUPPLY FAN HP				MFG.					MODEL
	RET/EXH FAN HP				MFG.					MODEL
4000	CFM-HTG	4000	CFM-CLG	10%	MIN %OA	100%	MAX %OA	31%	% HTG AREA SERVED	
COMMENT:										

COILS:

X	NONE	STM	HW	ELEC	MOD VLV	PREHEAT
	NONE	STM	X HW	ELEC	MOD VLV	HEATING
X	NONE	STM	HW	ELEC	MOD VLV	REHEAT
X	NONE	STM	HW	ELEC	MOD VLV	HUMID.
	NONE	X DX	CW		MOD VLV	COOLING

OPERATION:

HOURS ON:		S	M	T	W	T	F	S	COMMENTS		
PRESENT START TIME		0	0	0	0	0	0	0	TIMECLOCK?		
PRESENT STOP TIME		2400	2400	2400	2400	2400	2400	2400	NO		
REQUIRED START TIME		500	500	500	500	500	500	500			
REQUIRED STOP TIME		2200	2200	2200	2200	2200	2200	2200			
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	1	1	1	1	1	1	1	1

CONTROLS:

	X	PNEUMATIC	ELECTRIC	ELEC'NIC	DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT	DUAL SETPNT	SETBACK		
SPACE SETPOINT (oF):		OCC HEAT	UNOCC HEAT	OCC COOL	UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK	COLD DECK	MIXED AIR	OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y MAX OA (Y/N)	Y RA (Y/N)	N EA (Y/N)	
	Y	MA CONTROL	ECONO-DB	ECONO-ENT	OTHER	
DEMAND LIMIT:		YES	N NO			
COMMENTS:						

FILE: 768AH2

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)	N	EA (Y/N)	
	Y	MA CONTROL		ECONO – DB		ECONO – ENT		OTHER	
DEMAND LIMIT:		YES	N	NO					
COMMENTS:									

COMMENTS:

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 768

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 768CH1

REFRIGERATION EQUIPMENT SURVEY OBSERVATIONS

ACCU-1	CHILLER/COMPRESSOR NO.	OUTSIDE BUILDING	LOCATION (RM)

UNIT TYPE:

	CENTRIFUGAL WITH WATER SIDE COOLING TOWER		OTHER
	RECIPROCATING WITH WATER SIDE COOLING TOWER	X	AHU'S SERVED AHU-1
X	RECIPROCATING WITH AIR COOLED CONDENSING UNIT		
	ABSORPTION WITH WATER SIDE COOLING TOWER		
	AIR COOLED CONDENSING UNIT		
	CHW	X	DX
			OTHER

NAMEPLATE:

CHILLER	TRANE	MFG.	BTA180P-993-L-B	MODEL	B15143851D	SERIAL NO.
460	VOLTS	28.2	AMPS	3	PH	60
						HZ
						16.75
						CAPACITY (TONS)
CONDENSER FANS	MFG.			MODEL		3
						# OF FANS
230	VOLTS	2.1	AMPS	1	PH	60
						HZ
						0.5
						HP
CW PUMP	MFG.			MODEL		SERIAL NO.
	VOLTS		AMPS		PH	
						HZ
						HP
CNW PUMP	MFG.			MODEL		SERIAL NO.
	VOLTS		AMPS		PH	
						HZ
						HP

COMMENTS:

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENT
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	
REQUIRED START TIME	500	500	500	500	500	500	500	
REQUIRED STOP TIME	2200	2200	2200	2200	2200	2200	2200	
MONTHS ON:	J	F	M	A	M	J	J	A
	0	0	0	0	1	1	1	1
								S
								O
								N
								D
								0
								0
								0

CONTROLS:

	PNEUMATIC	X	ELECTRIC	ELEC'NIC	DDC	COMMENTS
SETPOINTS	CWS (oF)		CWR (oF)	CNWS (oF)	CNWR (oF)	
PANEL INDICATORS						
- PRESSURE	LITE-HI		LITE-LOW	GAUGES		
- TEMPERATURE	LITE-HI		LITE-LOW	GAUGES		
- OTHER						

COMMENTS:

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 768

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 768CH2

REFRIGERATION EQUIPMENT SURVEY OBSERVATIONS

ACCU-2	CHILLER/COMPRESSOR NO.	OUTSIDE BUILDING	LOCATION (RM)

UNIT TYPE:

	CENTRIFUGAL WITH WATER SIDE COOLING TOWER		OTHER
	RECIPROCATING WITH WATER SIDE COOLING TOWER	X	AHU'S SERVED AHU-2
X	RECIPROCATING WITH AIR COOLED CONDENSING UNIT		
	ABSORPTION WITH WATER SIDE COOLING TOWER		
	AIR COOLED CONDENSING UNIT		
	CHW	X	DX OTHER

NAMEPLATE:

CHILLER	TRANE	MFG.	BTA180P-993-L-B	MODEL	B15143851D	SERIAL NO.
460	VOLTS	28.2	AMPS	3	PH	60 HZ 16.75 CAPACITY (TONS)
CONDENSER FANS	MFG.		MODEL		3	# OF FANS
230	VOLTS	2.1	AMPS	1	PH	60 HZ 0.5 HP
CW PUMP	MFG.		MODEL			SERIAL NO.
	VOLTS		AMPS		PH	HZ HP
CNW PUMP	MFG.		MODEL			SERIAL NO.
	VOLTS		AMPS		PH	HZ HP

COMMENTS:

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENT			
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?			
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400				
REQUIRED START TIME	500	500	500	500	500	500	500				
REQUIRED STOP TIME	2200	2200	2200	2200	2200	2200	2200				
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
0	0	0	0	1	1	1	1	1	0	0	0

CONTROLS:

	PNEUMATIC	X	ELECTRIC	ELEC'NIC	DDC	COMMENTS
SETPOINTS	CWS (oF)		CWR (oF)	CNWS (oF)	CNWR (oF)	
PANEL INDICATORS						
- PRESSURE	LITE-HI		LITE-LOW	GAUGES		
- TEMPERATURE	LITE-HI		LITE-LOW	GAUGES		
- OTHER						

COMMENTS:

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
SETPOINTS		CWS (oF)		CWR (oF)		CNWS (oF)		CNWR (oF)	
PANEL INDICATORS									
- PRESSURE		LITE-HI		LITE-LOW		GAUGES			
- TEMPERATURE		LITE-HI		LITE-LOW		GAUGES			
- OTHER									
COMMENTS:									

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 768

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 768CH4

REFRIGERATION EQUIPMENT SURVEY OBSERVATIONS

ACCU-4	CHILLER/COMPRESSOR NO.	OUTSIDE BUILDING	LOCATION (RM)

UNIT TYPE:

	CENTRIFUGAL WITH WATER SIDE COOLING TOWER		OTHER
	RECIPROCATING WITH WATER SIDE COOLING TOWER	X	AHU'S SERVED AHU-4
X	RECIPROCATING WITH AIR COOLED CONDENSING UNIT		
	ABSORPTION WITH WATER SIDE COOLING TOWER		
	AIR COOLED CONDENSING UNIT		
	CHW	X	DX
			OTHER

NAMEPLATE:

CHILLER	TRANE	MFG.	BTD730A100B0	MODEL	SERIAL NO.
230	VOLTS	15	AMPS	1	PH
60	HZ	2.25	CAPACITY (TONS)		
CONDENSER FANS	MFG.	MODEL	1	# OF FANS	
230	VOLTS	1	AMPS	1	PH
60	HZ	0.25	HP		
CW PUMP	MFG.	MODEL	SERIAL NO.		
	VOLTS	AMPS	PH	HZ	HP
CNW PUMP	MFG.	MODEL	SERIAL NO.		
	VOLTS	AMPS	PH	HZ	HP

COMMENTS:

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENT			
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?			
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400				
REQUIRED START TIME	500	500	500	500	500	500	500				
REQUIRED STOP TIME	2200	2200	2200	2200	2200	2200	2200				
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
0	0	0	0	1	1	1	1	1	0	0	0

CONTROLS:

	PNEUMATIC	X	ELECTRIC	ELEC'NIC	DDC	COMMENTS
SETPOINTS	CWS (oF)		CWR (oF)	CNWS (oF)	CNWR (oF)	
PANEL INDICATORS						
- PRESSURE	LITE-HI		LITE-LOW	GAUGES		
- TEMPERATURE	LITE-HI		LITE-LOW	GAUGES		
- OTHER						

COMMENTS:

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 768

EMC NO.: #3204.000

DATE: Mar-93

PREPARED BY: **AJN**

CHECKED BY: CEL

FILE: 768DHW1

DOMESTIC HW SURVEY OBSERVATIONS

DHW-1	BOILER/CONVERTER NO.	MECH RM	LOCATION (RM)
ELEC.	SOURCE OF HEATING (PLANT)	ALL	SERVES AREA

UNIT TYPE:

	NO.2 OIL		NO.6 OIL		N.GAS	X	ELEC		FUELS:
	STM/HW		HTHW/HW		HTHW/STM		OTHER		CONVERTER TYPE:

COMMENT:

NAMEPLATE:

RUUD	MFG.	RP30P4-1	MODEL	4500	CAPACITY OUTPUT (WATTS)
	MFG.		MODEL		CAPACITY OUTPUT (BTUH)

DOMESTIC HW CIRCULATION PUMP: NONE

	HW PUMP 1 – HP		MFG.		MODEL
	HW PUMP 2 – HP		MFG.		MODEL
	HW PUMP 3 – HP		MFG.		MODEL

COMMENT:

DIMENSION:	DIAMETER (INCHES)	HEIGHT OR LENGTH (INCHES)	40 GALLON
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OPERATION:

[illegible]

CONTROLS:

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
SETPOINTS				HW SUPPLY					
COMMENTS:									

FIELD SURVEY NOTES

BUILDING 630
AND TYPICAL FOR
653, 657, 820, 836, 1027

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD

BLDG: 630

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: cmd

CHECKED BY: CEL

FILE: 630BLG

VI. BUILDING DATA SURVEY OBSERVATIONS

BLDG NO: 630 BLDG NAME: MESS HALL

ZONE NO.	1	FUNCTION: DINING HALL					
OCCUPANCY HOURS:	M-F	500	TO	1900	SAT	500	TO 1900
	SUN	500	TO	1900			
PRESENT TEMP	WINTER OCC	72.4 °F		UNOCC	72.4 °F		
	SUMMER OCC	°F		UNOCC	°F		

ZONE NO.	2	FUNCTION: KITCHEN					
OCCUPANCY HOURS:	M-F	300	TO	2000	SAT	300	TO 2000
	SUN	300	TO	2000			
PRESENT TEMP	WINTER OCC	75.5 °F		UNOCC	75.5 °F		
	SUMMER OCC	°F		UNOCC	°F		

ZONE NO.		FUNCTION:					
OCCUPANCY HOURS:	M-F		TO		SAT		TO
	SUN		TO				
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F		
	SUMMER OCC	°F		UNOCC	°F		

REMARKS: A. SERVE 2700 MEALS PER DAY
B. DHW CONVERTER, STM VALVE ACTUATOR DISCONNECTED FROM VALVE BODY
C. DHW CIRC. PUMP NOT WORKING
D. TIME CLOCK FOR AHU-1 NO PINS
E. BARBER COLEMAN ELECTRIC CONTROLS

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 630

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: CMD

CHECKED BY: CEL

FILE: 630HV1

AIR HANDLING UNIT SURVEY OBSERVATIONS

HV-1	AHU NO.	ATTIC WEST	LOCATION (RM)
	REF. SYS. SERVING AHU	KITCHEN	SERVES AREA

UNIT TYPE:

SINGLE ZN	2-PIPE FC	4-PIPE FC	UNIT HTR	X	H&V
MULTIZONE	DOUBLE DT	REHEAT	INDUCTION		VAV
OTHER		OTHER			
COMMENT:					

NAMEPLATE:

N/A				MFG.						MODEL	
5.0	SUPPLY FAN HP		N/A		MFG.						MODEL
	RET/EXH FAN HP				MFG.						MODEL
1800	CFM-HTG	0	CFM-CLG	100%	MIN %OA	100%	MAX %OA	50%	% HTG AREA SERVED		
COMMENT:											

COILS:

X	NONE		STM		HW		ELEC		MOD VLV	PREHEAT
	NONE		STM	X	HW		ELEC	X	MOD VLV	HEATING
X	NONE		STM		HW		ELEC		MOD VLV	REHEAT
X	NONE		STM		HW		ELEC		MOD VLV	HUMID.
X	NONE		STM		HW		ELEC		MOD VLV	COOLING

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENTS			
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?			
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400				
REQUIRED START TIME	300	300	300	300	300	300	300				
REQUIRED STOP TIME	2000	2000	2000	2000	2000	2000	2000				
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	0	0	0	0	0	1	1	1

CONTROLS:

	PNEUMATIC	X	ELECTRIC	ELEC'NIC	DDC	COMMENTS
THERMOSTAT TYPE:	SINGLE STPT		DUAL SETPNT	SETBACK		
SPACE SETPOINT (oF):	OCC HEAT		UNOCC HEAT	OCC COOL	UNOCC COOL	
OTHER SETPOINTS (oF):	HOT DECK		COLD DECK	MIXED AIR	OTHER	
DAMPER CONTROL:	MIN OA (Y/N)		MAX OA (Y/N)	RA (Y/N)	EA (Y/N)	
	MA CONTROL		ECONO-DB	ECONO-ENT	OTHER	
DEMAND LIMIT:	YES	N	NO			
COMMENTS:	BARBER COLEMAN CONTROLS					

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 630

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: CMD

CHECKED BY: CEL

FILE: 630PMP

REFRIGERATION EQUIPMENT SURVEY OBSERVATIONS

CHW PUMP	CHILLER/COMPRESSOR NO.	MECH. ROOM	LOCATION (RM)

UNIT TYPE:

	CENTRIFUGAL WITH WATER SIDE COOLING TOWER						OTHER
	RECIPROCATING WITH WATER SIDE COOLING TOWER						AHU'S SERVED
	RECIPROCATING WITH AIR COOLED CONDENSING UNIT						
	ABSORBTION WITH WATER SIDE COOLING TOWER						
	AIR COOLED CONDENSING UNIT						
	CHW		DX	X	OTHER		CHW PUMP ONLY

NAMEPLATE:

CHILLER		MFG.				MODEL				SERIAL NO.
	VOLTS		AMPS		PH		HZ		CAPACITY (TONS)	
TOWER		MFG.				MODEL				# OF FANS
	VOLTS		AMPS		PH		HZ		HP	
CW PUMHOWELL		MFG.	2247AD3			MODEL				SERIAL NO.
208	VOLTS	13	AMPS	3	PH	60	HZ	5	HP	
CNW PUMP		MFG.				MODEL				SERIAL NO.
	VOLTS		AMPS		PH		HZ		HP	
COMMENTS:										

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENT			
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?			
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400				
REQUIRED START TIME	500	500	500	500	500	500	500				
REQUIRED STOP TIME	1900	1900	1900	1900	1900	1900	1900				
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
0	0	0	0	1	1	1	1	1	0	0	0

CONTROLS:

	PNEUMATIC	ELECTRIC	ELEC'NIC	DDC	COMMENTS
SETPOINTS	CWS (oF)	CWR (oF)	CNWS (oF)	CNWR (oF)	NONE
PANEL INDICATORS					
- PRESSURE	LITE-HI	LITE-LOW	GAUGES		
- TEMPERATURE	LITE-HI	LITE-LOW	GAUGES		
- OTHER					
COMMENTS:					

EMC ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 630

EMC NO.: #3204.000

DATE: Mar-93

PREPARED BY: **CMD**

CHECKED BY: CEL

FILE: 630CV1

BOILER & CONVERTER SURVEY OBSERVATIONS

CV-1	BOILER/CONVERTER NO.	MECH RM	LOCATION (RM)
	SOURCE OF HEATING (PLANT)	ALL	SERVES AREA

UNIT TYPE:

	STEAM		PSIG		HW		TEMP.		BOILER TYPE:
	NO.2 OIL		NO.6 OIL		N.GAS		ELEC		FUELS:
X	STM/HW		HTHW/HW		HTHW/STM		OTHER		CONVERTER TYPE:
X	SPACE HEAT		DHW		OTHER				USE:
COMMENT:							% HTG AREA SERVED		
							BB RADIATION ONLY		

NAMEPLATE:

N/A		MFG.		MODEL	1300000	CAPACITY OUTPUT (BTUH)
					1300000	CAPACITY INPUT (BTUH)
		MFG.		MODEL		CAPACITY OUTPUT (BTUH)
						CAPACITY INPUT (BTUH)
1.5	HW PUMP 1 – HP	MARATHON		MFG.	LVL145TDDR795330WFL	MODEL
	HW PUMP 2 – HP			MFG.		MODEL
	HW PUMP 3 – HP			MFG.		MODEL
COMMENT: 200V, 5.5A, 3PH, 1745 RPM						

OPERATION:

[illegible]

CONTROLS:

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
SETPOINTS		PSIG		HW SUPPLY					
RESET CONTROL (oF):		HW HIGH		HW LOW		OA LOW		OA HIGH	
BURNER CONTROLS		O2 TRIM (Y/N)		OTHER					
COMMENTS:									

FILE: 630AH1

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			TIMECLOCK HAS NO PINS
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)	N	EA (Y/N)	
		MA CONTROL		ECONO - DB		ECONO - ENT		OTHER	
DEMAND LIMIT:	Y	YES		NO					
COMMENTS:	BARBER COLEMAN CONTROLS, ELECTRIC VALVE ACTUATORS, HOA								

FILE: 630AH2

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)	N	EA (Y/N)	
		MA CONTROL		ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:	Y	YES		NO					
COMMENTS:	BARBER								

FIELD SURVEY NOTES

BUILDINGS 636 & 741

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD

BLDG: 636

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 636BLG

VI. BUILDING DATA SURVEY OBSERVATIONS

BLDG NO: 636 BLDG NAME: BRIGADE HQ

ZONE NO.	1	FUNCTION: ADMINISTRATION					
OCCUPANCY HOURS:	M-F	600	TO	1900	SAT	800	TO 1600
	SUN	1200	TO	1600			
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F		
	SUMMER OCC	°F		UNOCC	°F		

ZONE NO.		FUNCTION:					
OCCUPANCY HOURS:	M-F		TO		SAT		TO
	SUN		TO				
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F		
	SUMMER OCC	°F		UNOCC	°F		

ZONE NO.		FUNCTION:					
OCCUPANCY HOURS:	M-F		TO		SAT		TO
	SUN		TO				
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F		
	SUMMER OCC	°F		UNOCC	°F		

REMARKS:

FILE: 636FC1

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:	X	SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (°F):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (°F):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	Y	MIN OA (Y/N)	Y	MAX OA (Y/N)		RA (Y/N)		EA (Y/N)	
		MA CONTROL		ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:		YES	N	NO					
COMMENTS:	CONTROLS: LOW, MED, HIGH, ON/OFF								

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 636

EMC NO.: #3204.000

DATE: Mar-93

PREPARED BY: **AJN**

CHECKED BY: CEL

FILE: 636CV1

BOILER & CONVERTER SURVEY OBSERVATIONS

CV-1	BOILER/CONVERTER NO.	MECH. RM.	LOCATION (RM)
C.P.	SOURCE OF HEATING (PLANT)	ALL	SERVES AREA

UNIT TYPE:

	STEAM		PSIG		HW		TEMP.		BOILER TYPE:
	NO.2 OIL		NO.6 OIL		N.GAS		ELEC		FUELS:
X	STM/HW		HTHW/HW		HTHW/STM		OTHER		CONVERTER TYPE:
	SPACE HEAT		DHW		OTHER				USE:
COMMENT:							0%	% HTG AREA SERVED	
								BB RADIATION ONLY	

NAMEPLATE:

NO NAME PLATE		MFG.		MODEL	520600	CAPACITY OUTPUT (BTUH)
					520600	CAPACITY INPUT (BTUH)
		MFG.		MODEL		CAPACITY OUTPUT (BTUH)
						CAPACITY INPUT (BTUH)
5	DTW PUMP 1 – HP	BELL & GOSSETT		MFG.	1 – 1/2 8C	MODEL
	HW PUMP 2 – HP			MFG.		MODEL
	HW PUMP 3 – HP			MFG.		MODEL
COMMENT:						

OPERATION:

[illegible]

CONTROLS:

	X	PNEUMATIC	ELECTRIC	ELEC'NIC	DDC	COMMENTS
SETPOINTS		PSIG	HW SUPPLY			
RESET CONTROL (oF)		HW HIGH	HW LOW	OA LOW	OA HIGH	
BURNER CONTROLS		O2 TRIM (Y/N)	OTHER			
COMMENTS: 2 BARBER COLMAN ELEC./PNEUMATIC TRANSDUCERS,						
HAS O.A. TEMPERATURE RESET						

FILE: 636UH1

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (°F):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (°F):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:		MIN OA (Y/N)		MAX OA (Y/N)		RA (Y/N)		EA (Y/N)	
		MA CONTROL		ECONO – DB		ECONO – ENT		OTHER	
DEMAND LIMIT:		YES		NO					
COMMENTS:									

		PNEUMATIC	X	ELECTRIC	ELEC'NIC	DDC	COMMENTS
SETPOINTS				HW SUPPLY			
COMMENTS:							

FIELD SURVEY NOTES

BUILDING 637

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD

BLDG: 637

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 637BLG

VI. BUILDING DATA SURVEY OBSERVATIONS

BLDG NO: 637 BLDG NAME: CHAPEL

ZONE NO.	1		FUNCTION: CHURCH						
OCCUPANCY HOURS:	M – F	1900	TO	2000	SAT	1900	TO	2000	
	SUN	700	TO	1200					
PRESENT TEMP	WINTER OCC		°F		UNOCC	°F			
	SUMMER OCC		°F		UNOCC	°F			

ZONE NO.		2		FUNCTION: ADMINISTRATION OFFICES					
OCCUPANCY HOURS:		M – F	700	TO	1700	SAT	1900	TO	2000
		SUN	700	TO	1200				
PRESENT TEMP	WINTER OCC		°F		UNOCC	°F			
	SUMMER OCC		°F		UNOCC	°F			

ZONE NO.		FUNCTION:							
OCCUPANCY HOURS:		M-F		TO		SAT		TO	
		SUN		TO					
PRESENT TEMP	WINTER OCC		°F		UNOCC	°F			
	SUMMER OCC		°F		UNOCC	°F			

REMARKS:

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 637

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 637AH1

AIR HANDLING UNIT SURVEY OBSERVATIONS

AHU-1	AHU NO.	MECH. ROOM	LOCATION (RM)
DX-1	REF. SYS. SERVING AHU	CHAPEL SANCTUARY (ZN1)	SERVES AREA

UNIT TYPE:

X	SINGLE ZN	2-PIPE FC	4-PIPE FC	UNIT HTR	H&V
	MULTIZONE	DOUBLE DT	REHEAT	INDUCTION	VAV
	NUMBER OF ZONES	OTHER			
	COMMENT:				

NAMEPLATE:

DUNHAM-BUSH					MFG.	VAH603				MODEL
10.0	SUPPLY FAN HP		NO NAME PLATE		MFG.					MODEL
	RET/EXH FAN HP				MFG.					MODEL
6970	CFM-HTG	6970	CFM-CLG	10%	MIN %OA	100%	MAX %OA	100%	% HTG AREA SERVED	
COMMENT:										

COILS:

X	NONE	STM	HW	ELEC	MOD VLV	PREHEAT
	NONE	STM	X HW	ELEC	X MOD VLV	HEATING
X	NONE	STM	HW	ELEC	MOD VLV	REHEAT
X	NONE	STM	HW	ELEC	MOD VLV	HUMID.
	NONE	X DX	CW		X MOD VLV	COOLING

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENTS			
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?			
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	YES,			
REQUIRED START TIME	700	1900	1900	1900	1900	1900	1900	NO PINS			
REQUIRED STOP TIME	1200	2000	2000	2000	2000	2000	2000				
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	1	1	1	1	1	1	1	1

CONTROLS:

	X	PNEUMATIC	ELECTRIC	ELEC'NIC	DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT	DUAL SETPNT	SETBACK		PNEUMATIC
SPACE SETPOINT (oF):		OCC HEAT	UNOCC HEAT	OCC COOL	UNOCC COOL	ACTUATORS
OTHER SETPOINTS (oF):		HOT DECK	COLD DECK	MIXED AIR	OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y MAX OA (Y/N)	Y RA (Y/N)	N EA (Y/N)	
		MA CONTROL	ECONO-DB	ECONO-ENT	OTHER	
DEMAND LIMIT:	Y	YES	NO			
COMMENTS:						

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 637

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 637CH1

REFRIGERATION EQUIPMENT SURVEY OBSERVATIONS

DX-1	CHILLER/COMPRESSOR NO.	OUTSIDE BLDG	LOCATION (RM)

UNIT TYPE:

	CENTRIFUGAL WITH WATER SIDE COOLING TOWER		OTHER
	RECIPROCATING WITH WATER SIDE COOLING TOWER	X	AHU'S SERVED AHU-1 (ZN1)
X	RECIPROCATING WITH AIR COOLED CONDENSING UNIT		
	ABSORPTION WITH WATER SIDE COOLING TOWER		
	AIR COOLED CONDENSING UNIT		
	CHW	X	DX
			OTHER

NAMEPLATE:

CHILLER	McQUAY	MFG.	STO30A1500	MODEL	5SC0803600	SERIAL NO.
230	VOLTS	61.8	AMPS	3	PH	60
						HZ
						30
						CAPACITY (TONS)
CONDENSER FANS	MFG.			MODEL		4
						# OF FANS
230	VOLTS	4	AMPS	3	PH	60
						HZ
						1
						HP
DTW PUMP	MFG.			MODEL		SERIAL NO.
	VOLTS		AMPS		PH	
						HZ
						HP
CNW PUMP	MFG.			MODEL		SERIAL NO.
	VOLTS		AMPS		PH	
						HZ
						HP

COMMENTS:

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENT			
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?			
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	NO TIMECLOCK			
REQUIRED START TIME	700	1900	1900	1900	1900	1900	1900				
REQUIRED STOP TIME	1200	2000	2000	2000	2000	2000	2000				
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
0	0	0	0	1	1	1	1	1	0	0	0

CONTROLS:

	PNEUMATIC	X	ELECTRIC	ELEC'NIC	DDC	COMMENTS
SETPOINTS	CWS (oF)		CWR (oF)	CNWS (oF)	CNWR (oF)	
PANEL INDICATORS						
- PRESSURE	LITE-HI		LITE-LOW	GAUGES		
- TEMPERATURE	LITE-HI		LITE-LOW	GAUGES		
- OTHER						
COMMENTS:						

	X	PNEUMATIC	ELECTRIC	ELEC'NIC	DDC	COMMENTS
SETPOINTS		PSIG	HW SUPPLY			
RESET CONTROL (oF)		HW HIGH	HW LOW	OA LOW	OA HIGH	
BURNER CONTROLS		O2 TRIM (Y/N)	OTHER			
COMMENTS:						

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 637

EMC NO.: #3204.000

DATE: Mar-93

PREPARED BY: **AJN**

CHECKED BY: CEL

FILE: 637CV2

BOILER & CONVERTER SURVEY OBSERVATIONS

CV-2	BOILER/CONVERTER NO.	MECH. RM.	LOCATION (RM)
C. PLANT	SOURCE OF HEATING (PLANT)	OFFICE AREA (ZN2)	SERVES AREA

UNIT TYPE:

	STEAM		PSIG		HW		TEMP.		BOILER TYPE:
	NO.2 OIL		NO.6 OIL		N.GAS		ELEC		FUELS:
X	STM/HW		HTHW/HW		HTHW/STM		OTHER	S&T	CONVERTER TYPE:
	SPACE HEAT		DHW		OTHER				USE:
COMMENT: EXP. TANK IS WATER LOGGED							0%	% HTG AREA SERVED	
DUAL TEMPERATURE SYSTEM								BB RADIATION ONLY	

NAMEPLATE:

NO NAME PLATE		MFG.		MODEL	120000	CAPACITY OUTPUT (BTUH)
					120000	CAPACITY INPUT (BTUH)
		MFG.		MODEL		CAPACITY OUTPUT (BTUH)
						CAPACITY INPUT (BTUH)
0.75	HW PUMP 1 – HP	NO NAME PLATE		MFG.		MODEL
	HW PUMP 2 – HP			MFG.		MODEL
	COND. PUMP – HP			MFG.		MODEL

COMMENT: PUMP AND CONVERTER ARE VERY OLD

OPERATION:

HOURS ON:		S	M	T	W	T	F	S	COMMENT		
PRESENT START TIME		0	0	0	0	0	0	0	TIMECLOCK?		
PRESENT STOP TIME		2400	2400	2400	2400	2400	2400	2400	NO TIMECLOCK		
REQUIRED START TIME		700	700	700	700	700	700	1900			
REQUIRED STOP TIME		1200	1700	1700	1700	1700	1700	2000			
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	0	0	0	0	0	1	1	1

CONTROLS:

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
SETPOINTS		PSIG		HW SUPPLY					
RESET CONTROL (oF)		HW HIGH		HW LOW		OA LOW		OA HIGH	
BURNER CONTROLS		O2 TRIM (Y/N)		OTHER					
COMMENTS:									

FILE: 637FC1

CONTROLS:									
		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (°F):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (°F):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:		MIN OA (Y/N)		MAX OA (Y/N)		RA (Y/N)		EA (Y/N)	
		MA CONTROL		ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:		YES	N	NO					
COMMENTS:									

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 637

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 637CH2

REFRIGERATION EQUIPMENT SURVEY OBSERVATIONS

CH-1	CHILLER/COMPRESSOR NO.	OUTSIDE BLDG	LOCATION (RM)

UNIT TYPE:

	CENTRIFUGAL WITH WATER SIDE COOLING TOWER		OTHER
	RECIPROCATING WITH WATER SIDE COOLING TOWER	X	AHU'S SERVED FC-1 (ZN2)
X	RECIPROCATING WITH AIR COOLED CONDENSING UNIT		
	ABSORPTION WITH WATER SIDE COOLING TOWER		
	AIR COOLED CONDENSING UNIT		
X	CHW	DX	OTHER

NAMEPLATE:

CHILLER McQUAY		MFG.	ALR020A			MODEL	5SC0714100			SERIAL NO.
208	VOLTS	80	AMPS	3	PH	60	HZ	20	CAPACITY (TONS)	
CONDENSER FANS		MFG.				MODEL				3 # OF FANS
208	VOLTS	4.4	AMPS	1	PH	60	HZ	0.75	HP	
DTW PUMP		MFG.	NO NAME PLATE			MODEL				SERIAL NO.
	VOLTS		AMPS		PH		HZ	0.75	HP	
CNW PUMP		MFG.				MODEL				SERIAL NO.
	VOLTS		AMPS		PH		HZ		HP	

COMMENTS:

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENT
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	NO TIMECLOCK
REQUIRED START TIME	700	700	700	700	700	700	1900	
REQUIRED STOP TIME	1200	1700	1700	1700	1700	1700	2000	

MONTHS ON:

J	F	M	A	M	J	J	A	S	O	N	D
0	0	0	0	1	1	1	1	1	0	0	0

CONTROLS:

	PNEUMATIC	X	ELECTRIC	ELEC'NIC	DDC	COMMENTS
SETPOINTS	CWS (oF)		CWR (oF)	CNWS (oF)	CNWR (oF)	
PANEL INDICATORS						
- PRESSURE	LITE-HI		LITE-LOW	GAUGES		
- TEMPERATURE	LITE-HI		LITE-LOW	GAUGES		
- OTHER						

COMMENTS: HAS FM SWITCH AND FLOW SWITCH

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 637

EMC NO.: #3204.000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 637DHW1

DOMESTIC HW SURVEY OBSERVATIONS

DHW-1	BOILER/CONVERTER NO.	MECH RM NO. 2	LOCATION (RM)
ELEC.	SOURCE OF HEATING (PLANT)	ALL	SERVES AREA

UNIT TYPE:

NO.2 OIL	NO.6 OIL	N.GAS	X	ELEC	FUELS:
STM/HW	HTHW/HW	HTHW/STM		OTHER	CONVERTER TYPE:

COMMENT:

NAMEPLATE:

NATIONAL	MFG.	NO NAME PLATE	MODEL	4500	CAPACITY OUTPUT (WATTS)
	MFG.		MODEL		CAPACITY OUTPUT (BTUH)

DOMESTIC HW CIRCULATION PUMP: NONE

HW PUMP 1 - HP	MFG.	MODEL
HW PUMP 2 - HP	MFG.	MODEL
HW PUMP 3 - HP	MFG.	MODEL

COMMENT:

DIMENSION: 20 DIAMETER (INCHES) 36 HEIGHT OR LENGTH (INCHES) 30 GALLON

OPERATION:

HOURS ON:		S	M	T	W	T	F	S	COMMENT		
PRESENT START TIME		0	0	0	0	0	0	0	TIMECLOCK?		
PRESENT STOP TIME		2400	2400	2400	2400	2400	2400	2400	NO		
REQUIRED START TIME		700	700	700	700	1700	1700	1900			
REQUIRED STOP TIME		1200	2000	2000	2000	2000	2000	2000			
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	1	1	1	1	1	1	1	1

CONTROLS:

	PNEUMATIC	X	ELECTRIC	ELEC'NIC	DDC	COMMENTS
SETPOINTS			HW SUPPLY			
COMMENTS:						

FIELD SURVEY NOTES

BUILDING 638
AND TYPICAL FOR
832 & 1018

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD

BLDG: 638

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 638BLG

VI. BUILDING DATA SURVEY OBSERVATIONS

BLDG NO: 638 BLDG NAME: CLINIC

ZONE NO.	1	FUNCTION: MEDICAL PROVISION					
OCCUPANCY HOURS:	M-F	600	TO	1500	SAT	700	TO 1300
	SUN	800	TO	1200			
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F		
	SUMMER OCC	°F		UNOCC	°F		

ZONE NO.		FUNCTION:					
OCCUPANCY HOURS:	M-F		TO		SAT		TO
	SUN		TO				
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F		
	SUMMER OCC	°F		UNOCC	°F		

ZONE NO.		FUNCTION:					
OCCUPANCY HOURS:	M-F		TO		SAT		TO
	SUN		TO				
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F		
	SUMMER OCC	°F		UNOCC	°F		

REMARKS:

FILE: 638AH1

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:	X	SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):	70	OCC HEAT		UNOCC HEAT	78	OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)	Y	EA (Y/N)	
		MA CONTROL		ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:	Y	YES		NO					
COMMENTS: CONTROLS ARE IN GOOD CONDITION									

CONTROLS:

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY
CLIENT CONTRACT NO.: DACA 41-92-C-0098
CLIENT PROJ. ENG: DOUG CAGE
LOCATION: FT. LEONARD WOOD BLDG: 638

DATE: Mar-93
PREPARED BY: AJN
CHECKED BY: CEL
FILE: 638DHW1

LOCATION: FT. LEONARD WOOD BLDG. 000 FLOOR: 00000000			
DOMESTIC HW SURVEY OBSERVATIONS			
DHW - 1	BOILER/CONVERTER NO.	MECH RM	LOCATION (RM)
C. PLANT	SOURCE OF HEATING (PLANT)	ALL	SERVES AREA

UNIT TYPE:									
	NO.2 OIL		NO.6 OIL		N.GAS	X	ELEC		FUELS:
X	STM/HW		HTHW/HW		HTHW/STM		OTHER		CONVERTER TYPE:
COMMENT:									

NAMEPLATE:					
	MFG.	NO NAME PLATE	MODEL		CAPACITY OUTPUT (WATTS)
	MFG.		MODEL		CAPACITY OUTPUT (BTUH)
DOMESTIC HW CIRCULATION PUMP: NONE					
	HW PUMP 1 – HP		MFG.		MODEL
	HW PUMP 2 – HP		MFG.		MODEL
	HW PUMP 3 – HP		MFG.		MODEL
COMMENT:					

DIMENSION:	26	DIAMETER (INCHES)	64	HEIGHT OR LENGTH (INCHES)	GALLON
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[illegible]

CONTROLS:									
	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
SETPOINTS				HW SUPPLY					
COMMENTS:									

FIELD SURVEY NOTES

BUILDING 639

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD

BLDG: 639

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 639BLG

VI. BUILDING DATA SURVEY OBSERVATIONS

BLDG NO: 639

BLDG NAME: PX

ZONE NO.	1	FUNCTION: STORE/SNACK BAR						
OCCUPANCY HOURS:	M-F	1700	TO	2000	SAT	1700	TO	2000
	SUN	1300	TO	2000				
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F			
	SUMMER OCC	°F		UNOCC	°F			

ZONE NO.	2	FUNCTION: GAME ROOM						
OCCUPANCY HOURS:	M-F	1700	TO	2000	SAT	1700	TO	2000
	SUN	1300	TO	2000				
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F			
	SUMMER OCC	°F		UNOCC	°F			

ZONE NO.		FUNCTION:						
OCCUPANCY HOURS:	M-F		TO		SAT		TO	
	SUN		TO					
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F			
	SUMMER OCC	°F		UNOCC	°F			

REMARKS:

CONTROLS:

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 639

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 639CH1

REFRIGERATION EQUIPMENT SURVEY OBSERVATIONS

DX-1	CHILLER/COMPRESSOR NO.	MECH. ROOM	LOCATION (RM)

UNIT TYPE:

	CENTRIFUGAL WITH WATER SIDE COOLING TOWER		OTHER
	RECIPROCATING WITH WATER SIDE COOLING TOWER	X	AHU'S SERVED AHU-1
X	RECIPROCATING WITH AIR COOLED CONDENSING UNIT		
	ABSORPTION WITH WATER SIDE COOLING TOWER		
	AIR COOLED CONDENSING UNIT		
	CHW	X	DX
			OTHER

NAMEPLATE:

CHILLER	CARRIER	MFG.	38ADO24520	MODEL	P29319	SERIAL NO.
230	VOLTS	76	AMPS	3	PH	60
						HZ
						20.5
						CAPACITY (TONS)
TOWER	MFG.			MODEL		# OF FANS
	VOLTS		AMPS		PH	
						HZ
						HP
CW PUMP	MFG.			MODEL		SERIAL NO.
	VOLTS		AMPS		PH	
						HZ
						HP
CNW PUMP	MFG.			MODEL		SERIAL NO.
	VOLTS		AMPS		PH	
						HZ
						HP

COMMENTS: FM RADIO CONTROL

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENT
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	
REQUIRED START TIME	1700	1700	1700	1700	1700	1700	1300	
REQUIRED STOP TIME	2000	2000	2000	2000	2000	2000	2000	
MONTHS ON:	J	F	M	A	M	J	J	A
	0	0	0	0	1	1	1	1
								S
								O
								N
								D
								0
								0
								0

CONTROLS:

	PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
SETPOINTS	CWS (oF)		CWR (oF)		CNWS (oF)		CNWR (oF)	
PANEL INDICATORS								
- PRESSURE	LITE-HI		LITE-LOW		GAUGES			
- TEMPERATURE	LITE-HI		LITE-LOW		GAUGES			
- OTHER								
COMMENTS:								

FILE: 639FC1

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:	X	SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (°F):	72	OCC HEAT	72	UNOCC HEAT		OCC COOL		UNOCC COOL	72° MEASURED
OTHER SETPOINTS (°F):		HOT DECK		COLD DECK	N	MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	N	MAX OA (Y/N)	Y	RA (Y/N)		EA (Y/N)	
	N	MA CONTROL	N	ECONO-DB	N	ECONO-ENT		OTHER	
DEMAND LIMIT:		YES	N	NO					
COMMENTS:									

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 639

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 639CH2

REFRIGERATION EQUIPMENT SURVEY OBSERVATIONS

DX-2	CHILLER/COMPRESSOR NO.	OUTSIDE BLDG	LOCATION (RM)

UNIT TYPE:

	CENTRIFUGAL WITH WATER SIDE COOLING TOWER		OTHER
	RECIPROCATING WITH WATER SIDE COOLING TOWER	X	AHU'S SERVED FC-1
X	RECIPROCATING WITH AIR COOLED CONDENSING UNIT		
	ABSORPTION WITH WATER SIDE COOLING TOWER		
	AIR COOLED CONDENSING UNIT		
	CHW	X	DX
			OTHER

NAMEPLATE:

CHILLER --->	MFG.	CLIMATE CONTROL	MODEL	NOs. NOT LEGIBLE	SERIAL NO.
230 VOLTS	15.2	AMPS 3 PH	60 HZ	3.5	CAPACITY (TONS)
TOWER	MFG.		MODEL		# OF FANS
	VOLTS	AMPS	PH	HZ	HP
CW PUMP	MFG.		MODEL		SERIAL NO.
	VOLTS	AMPS	PH	HZ	HP
CNW PUMP	MFG.		MODEL		SERIAL NO.
	VOLTS	AMPS	PH	HZ	HP

COMMENTS: TOTAL OF TWO ACCUs, FM RADIO CONTROL ON EACH UNIT

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENT			
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?			
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400				
REQUIRED START TIME	1700	1700	1700	1700	1700	1700	1300				
REQUIRED STOP TIME	2000	2000	2000	2000	2000	2000	2000				
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
0	0	0	0	1	1	1	1	1	0	0	0

CONTROLS:

	PNEUMATIC	X	ELECTRIC	ELEC'NIC	DDC	COMMENTS
SETPOINTS	CWS (oF)		CWR (oF)	CNWS (oF)	CNWR (oF)	
PANEL INDICATORS						
- PRESSURE	LITE-HI		LITE-LOW	GAUGES		
- TEMPERATURE	LITE-HI		LITE-LOW	GAUGES		
- OTHER						
COMMENTS:						

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 639

EMC NO.: #3204.000

DATE: Mar-93

PREPARED BY: **AJN**

CHECKED BY: CEL

FILE: 639DHW1

DOMESTIC HW SURVEY OBSERVATIONS

DHW-1	BOILER/CONVERTER NO.	MECH RM	LOCATION (RM)
ELEC.	SOURCE OF HEATING (PLANT)	ALL	SERVES AREA

UNIT TYPE:

	NO.2 OIL		NO.6 OIL		N.GAS	X	ELEC		FUELS:
	STM/HW		HTHW/HW		HTHW/STM		OTHER		CONVERTER TYPE:

COMMENT:

NAMEPLATE:

DAYTON	MFG.	3E202L	MODEL	4500	CAPACITY OUTPUT (WATTS)
	MFG.		MODEL		CAPACITY OUTPUT (BTUH)

DOMESTIC HW CIRCULATION PUMP: **NONE**

	HW PUMP 1 – HP		MFG.		MODEL
	HW PUMP 2 – HP		MFG.		MODEL
	HW PUMP 3 – HP		MFG.		MODEL

COMMENT:

DIMENSION:	22	DIAMETER (INCHES)	48	HEIGHT OR LENGTH (INCHES)	40	GALLON
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OPERATION:

[illegible]

MONTHS ON:

[illegible]

CONTROLS:

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
SETPOINTS				HW SUPPLY					

COMMENTS:

FIELD SURVEY NOTES

BUILDING 650
AND TYPICAL FOR
732, 740, 750, 753,
822, 838, 842, 1022, & 1023

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD

BLDG: 650

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: JDR

CHECKED BY: CEL

FILE: 650BLG

VI. BUILDING DATA SURVEY OBSERVATIONS

BLDG NO: 650 BLDG NAME: BAT. HQ

ZONE NO.	1	FUNCTION: ADMIN					
OCCUPANCY HOURS:	M-F	500	TO	1800	SAT	700	TO 1400
	SUN	0	TO	0			
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F		
	SUMMER OCC	°F		UNOCC	°F		

ZONE NO.		FUNCTION:					
OCCUPANCY HOURS:	M-F		TO		SAT		TO
	SUN		TO				
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F		
	SUMMER OCC	°F		UNOCC	°F		

ZONE NO.		FUNCTION:					
OCCUPANCY HOURS:	M-F		TO		SAT		TO
	SUN		TO				
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F		
	SUMMER OCC	°F		UNOCC	°F		

REMARKS: A. TIME CLOCK FOR AHU HAS PINS, BUT IS NOT CONNECT TO STARTER CIRCUIT

FILE: 650AH1

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			DAMPERS CONNECTED
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	& WORKING
OTHER SETPOINTS (oF):	N/A	HOT DECK	N/A	COLD DECK	N/A	MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)	N	EA (Y/N)	
		MA CONTROL		ECONO - DB		ECONO - ENT		OTHER	
DEMAND LIMIT:	Y	YES		NO					
COMMENTS:									

LOCATION: FT. LEONARD WOOD BLDG: 650

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: BHS

CHECKED BY: CEL

FILE: 650RD1

PERIMETER RADIATION SURVEY OBSERVATIONS

RAD-1	PER RAD NO.	MECH. RM.	LOCATION (RM)
	SOURCE OF HEATING	ALL	SERVES AREA

UNIT TYPE:

	STEAM	X	HW		ELECTRIC				
	OTHER								
	COMMENT:								

NAMEPLATE:

	HW PUMP 1 – HP		MFG.			MODEL
	HW PUMP 2 – HP		MFG.			MODEL
	HW PUMP 3 – HP		MFG.			MODEL
	HW PUMP 4 – HP		MFG.			MODEL
COMMENT:					26.5%	% AREA HEATING

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENT			
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?			
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	NO			
REQUIRED START TIME	0	500	500	500	500	500	700				
REQUIRED STOP TIME	0	1800	1800	1800	1800	1800	1400				
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	0	0	0	0	0	0	1	1	1

CONTROLS:

		PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
RADIATION CONTROL	X	NONE		2-WAY VLV		3-WAY VLV		OTHER	
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
RESET CONTROL (oF):		HW HIGH		HW LOW		OA LOW		OA HIGH	
COMMENTS:									

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
SETPOINTS		PSIG	N/A	HW SUPPLY					
RESET CONTROL (oF)		HW HIGH		HW LOW		OA LOW		OA HIGH	
BURNER CONTROLS		O2 TRIM (Y/N)		OTHER					
COMMENTS:									

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 650

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: DR

CHECKED BY: CEL

FILE: 650CH1

REFRIGERATION EQUIPMENT SURVEY OBSERVATIONS

CH-1	CHILLER/COMPRESSOR NO.	OUTSIDE MECH. RM.	LOCATION (RM)

UNIT TYPE:

	CENTRIFUGAL WITH WATER SIDE COOLING TOWER		OTHER
	RECIPROCATING WITH WATER SIDE COOLING TOWER	AHU-1	AHU'S SERVED
	RECIPROCATING WITH AIR COOLED CONDENSING UNIT		
	ABSORPTION WITH WATER SIDE COOLING TOWER		
X	AIR COOLED CONDENSING UNIT		
	CHW	X	DX
			OTHER

NAMEPLATE:

CHILLER	MCQUAY	MFG.	STO30A1S	MODEL	359A815G11	SERIAL NO.
230	VOLTS	140	AMPS	3	PH	60
						30
						CAPACITY (TONS)
TOWER		MFG.		MODEL		3
						# OF FANS
230	VOLTS	8.4	AMPS	3	PH	60
						1
						HP each
CW PUMP		MFG.		MODEL		SERIAL NO.
	VOLTS		AMPS		PH	
						HZ
						HP
CNW PUMP		MFG.		MODEL		SERIAL NO.
	VOLTS		AMPS		PH	
						HZ
						HP

COMMENTS:

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENT			
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?			
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	YES			
REQUIRED START TIME	0	500	500	500	500	500	700				
REQUIRED STOP TIME	0	1800	1800	1800	1800	1800	1400				
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
0	0	0	0	1	1	1	1	1	0	0	0

CONTROLS:

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
SETPOINTS		CWS (oF)		CWR (oF)		CNWS (oF)		CNWR (oF)	
PANEL INDICATORS									
- PRESSURE		LITE-HI		LITE-LOW		GAUGES			
- TEMPERATURE		LITE-HI		LITE-LOW		GAUGES			
- OTHER									

COMMENTS:

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 650

EMC NO.: #3204.000

DATE: Mar-93

PREPARED BY: DR

CHECKED BY: CEL

FILE: 650DHW

DOMESTIC HW SURVEY OBSERVATIONS

DHW-1	BOILER/CONVERTER NO.	MER	LOCATION (RM)
ELEC	SOURCE OF HEATING (PLANT)	ALL	SERVES AREA

UNIT TYPE:

NO.2 OIL	NO.6 OIL	N.GAS	X	ELEC	FUELS:
STM/HW	HTHW/HW	HTHW/STM		OTHER	CONVERTER TYPE:

COMMENT:

NAMEPLATE:

MFG.	MODEL	1.65	CAPACITY OUTPUT (BTUH,KW)
MFG.	MODEL		CAPACITY OUTPUT (BTUH,KW)

DOMESTIC HW CIRCULATION PUMP:

HW PUMP 1 - HP	MFG.	MODEL
HW PUMP 2 - HP	MFG.	MODEL
HW PUMP 3 - HP	MFG.	MODEL

COMMENT:

DIMENSION: 14 DIAMETER (INCHS) 18 HEIGHT OR LENGTH (INCHES) 6 GALLON

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENT
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	NO
REQUIRED START TIME	0	500	500	500	500	500	700	
REQUIRED STOP TIME	0	1800	1800	1800	1800	1800	1400	

MONTHS ON:

J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	1	1	1	1	1	1	1	1

CONTROLS:

PNEUMATIC	X	ELECTRIC	ELEC'NIC	DDC	COMMENTS
SETPOINTS		HW SUPPLY			

COMMENTS:

FIELD SURVEY NOTES

BUILDING 655
AND TYPICAL FOR
626, 633, 656, 733, 734,
751, 752, 823, 824, 840, AND 841

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD

BLDG: 655

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 655BLG

VI. BUILDING DATA SURVEY OBSERVATIONS

BLDG NO: 655 BLDG NAME: ADMINISTRATION/SUPPLY

ZONE NO.	1	FUNCTION: COMPANY ADMINISTRATION/SUPPLY					
OCCUPANCY HOURS:	M-F	500	TO	1900	SAT	500	TO 1900
	SUN	500	TO	1900			
PRESENT TEMP	WINTER OCC	°F	UNOCC	°F			
	SUMMER OCC	°F	UNOCC	°F			

ZONE NO.	FUNCTION:						
OCCUPANCY HOURS:	M-F		TO		SAT		TO
	SUN		TO				
PRESENT TEMP	WINTER OCC	°F	UNOCC	°F			
	SUMMER OCC	°F	UNOCC	°F			

ZONE NO.	FUNCTION:						
OCCUPANCY HOURS:	M-F		TO		SAT		TO
	SUN		TO				
PRESENT TEMP	WINTER OCC	°F	UNOCC	°F			
	SUMMER OCC	°F	UNOCC	°F			

REMARKS:

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
SETPOINTS		PSIG		HW SUPPLY					
RESET CONTROL (oF)	180	HW HIGH	90	HW LOW	65	OA LOW	0	OA HIGH	
BURNER CONTROLS		O2 TRIM (Y/N)		OTHER					
COMMENTS: TIMECLOCK HAS NO PINS									

		PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
RADIATION CONTROL	X	NONE		2-WAY VLV		3-WAY VLV		OTHER	
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
RESET CONTROL (oF):		HW HIGH		HW LOW		OA LOW		OA HIGH	
COMMENTS:									

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
SETPOINTS				HW SUPPLY					
COMMENTS: ELEC. SENSOR SET @ 150 F (AQUASTAT TYPE)									

FIELD SURVEY NOTES

BUILDING 802

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD

BLDG: 802

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 802BLG

VI. BUILDING DATA SURVEY OBSERVATIONS

BLDG NO: 802 BLDG NAME: DAY CARE

ZONE NO.	1	FUNCTION: DAY CARE						
OCCUPANCY HOURS:	M – F	800	TO	1900	SAT	0	TO	0
	SUN	0	TO	0				
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F			
	SUMMER OCC	°F		UNOCC	°F			

ZONE NO.		FUNCTION:							
OCCUPANCY HOURS:		M—F		TO		SAT		TO	
		SUN		TO					
PRESENT TEMP	WINTER OCC		°F		UNOCC	°F			
	SUMMER OCC		°F		UNOCC	°F			

ZONE NO.		FUNCTION:							
OCCUPANCY HOURS:		M—F		TO		SAT		TO	
		SUN		TO					
PRESENT TEMP	WINTER OCC		°F		UNOCC	°F			
	SUMMER OCC		°F		UNOCC	°F			

REMARKS:

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 802

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 802AH1

AIR HANDLING UNIT SURVEY OBSERVATIONS

ACU-1	AHU NO.	ROOFTOP	LOCATION (RM)
DX-1	REF. SYS. SERVING AHU	ALL	SERVES AREA

UNIT TYPE:

X	SINGLE ZN	2-PIPE FC	4-PIPE FC	UNIT HTR	H&V
	MULTIZONE	DOUBLE DT	REHEAT	INDUCTION	VAV
	NUMBER OF ZONES	OTHER			
	COMMENT: GAS-FIRED HEATING				

NAMEPLATE:

CARRIER	MFG.	MODEL
1.5 SUPPLY FAN HP NO NAME PLATE	MFG.	MODEL
RET/EXH FAN HP	MFG.	MODEL
2700 CFM-HTG 2700 CFM-CLG 15% MIN %OA 15% MAX %OA 50% % HTG AREA SERVED		
COMMENT:		

COILS:

X	NONE	STM	HW	ELEC	MOD VLV	PREHEAT
	NONE	STM	HW	ELEC	MOD VLV	HEATING
X	NONE	STM	HW	ELEC	MOD VLV	REHEAT
X	NONE	STM	HW	ELEC	MOD VLV	HUMID.
	NONE	X DX	CW		MOD VLV	COOLING

OPERATION:

HOURS ON:								S	M	T	W	T	F	S	COMMENTS	
PRESENT START TIME		0		0		0		0		0		0		0		TIMECLOCK?
PRESENT STOP TIME		2400		2400		2400		2400		2400		2400		2400		
REQUIRED START TIME		0		800		800		800		800		800		0		
REQUIRED STOP TIME		0		1900		1900		1900		1900		1900		0		
MONTHS ON:																
J	F	M	A	M	J	J	A	S	O	N	D					
1	1	1	1	1	1	1	1	1	1	1	1					

CONTROLS:

	PNEUMATIC	X	ELECTRIC	ELEC'NIC	DDC	COMMENTS
THERMOSTAT TYPE:	SINGLE STPT		DUAL SETPNT	SETBACK		
SPACE SETPOINT (oF):	OCC HEAT		UNOCC HEAT	OCC COOL	UNOCC COOL	
OTHER SETPOINTS (oF):	HOT DECK		COLD DECK	MIXED AIR	OTHER	
DAMPER CONTROL:	N MIN OA (Y/N)	N	MAX OA (Y/N)	N RA (Y/N)	N EA (Y/N)	
	MA CONTROL		ECONO-DB	ECONO-ENT	OTHER	
DEMAND LIMIT:	YES	N	NO			
COMMENTS:						

FILE: 802AH2

CONTROLS:									
		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	N	MAX OA (Y/N)	N	RA (Y/N)	N	EA (Y/N)	
		MA CONTROL		ECONO - DB		ECONO - ENT		OTHER	
DEMAND LIMIT:		YES	N	NO					
COMMENTS:									

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 802

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 802CH1

REFRIGERATION EQUIPMENT SURVEY OBSERVATIONS

DX-1	CHILLER/COMPRESSOR NO.	ROOFTOP ACU	LOCATION (RM)

UNIT TYPE:

	CENTRIFUGAL WITH WATER SIDE COOLING TOWER		OTHER
	RECIPROCATING WITH WATER SIDE COOLING TOWER	X	AHU'S SERVED AC-1
	RECIPROCATING WITH AIR COOLED CONDENSING UNIT		
	ABSORPTION WITH WATER SIDE COOLING TOWER		
X	AIR COOLED CONDENSING UNIT		
	CHW	X	DX
			OTHER

NAMEPLATE:

CHILLER	CARRIER	MFG.	50RQ008400KB	MODEL	K986002	SERIAL NO.
200	VOLTS	164	MCA	3	PH	60
	HZ		8.4	CAPACITY (TONS)		
CONDENSER FANS	MFG.		MODEL			# OF FANS
	VOLTS		AMPS		PH	
				HZ		HP
DTW PUMP	MFG.		MODEL			SERIAL NO.
	VOLTS		AMPS		PH	
				HZ		HP
CNW PUMP	MFG.		MODEL			SERIAL NO.
	VOLTS		AMPS		PH	
				HZ		HP
COMMENTS:						

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENT
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	
REQUIRED START TIME	0	800	800	800	800	800	0	
REQUIRED STOP TIME	0	1900	1900	1900	1900	1900	0	
MONTHS ON:								
J	F	M	A	M	J	J	A	S
1	1	1	1	1	1	1	1	1

CONTROLS:

	PNEUMATIC	X	ELECTRIC	ELEC'NIC	DDC	COMMENTS
SETPOINTS	CWS (oF)		CWR (oF)	CNWS (oF)	CNWR (oF)	
PANEL INDICATORS						
- PRESSURE	LITE-HI		LITE-LOW	GAUGES		
- TEMPERATURE	LITE-HI		LITE-LOW	GAUGES		
- OTHER						

COMMENTS: RADIO CONTROL ON AC UNIT

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 802

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 802CH2

REFRIGERATION EQUIPMENT SURVEY OBSERVATIONS

DX-2	CHILLER/COMPRESSOR NO.	ROOFTOP ACU	LOCATION (RM)

UNIT TYPE:

	CENTRIFUGAL WITH WATER SIDE COOLING TOWER		OTHER
	RECIPROCATING WITH WATER SIDE COOLING TOWER	X	AHU'S SERVED AC-2
	RECIPROCATING WITH AIR COOLED CONDENSING UNIT		
	ABSORPTION WITH WATER SIDE COOLING TOWER		
X	AIR COOLED CONDENSING UNIT		
	CHW	X	DX
			OTHER

NAMEPLATE:

CHILLER CARRIER	MFG.	50RQ008400KB	MODEL	K986002	SERIAL NO.
200 VOLTS	164 MCA	3 PH	60 HZ	8.4	CAPACITY (TONS)
CONDENSER FANS	MFG.		MODEL		# OF FANS
	VOLTS	AMPS	PH	HZ	HP
DTW PUMP	MFG.		MODEL		SERIAL NO.
	VOLTS	AMPS	PH	HZ	HP
CNW PUMP	MFG.		MODEL		SERIAL NO.
	VOLTS	AMPS	PH	HZ	HP

COMMENTS:

OPERATION:

HOURS ON:		S	M	T	W	T	F	S	COMMENT		
PRESENT START TIME		0	0	0	0	0	0	0	TIMECLOCK?		
PRESENT STOP TIME		2400	2400	2400	2400	2400	2400	2400			
REQUIRED START TIME		0	800	800	800	800	800	0			
REQUIRED STOP TIME		0	1900	1900	1900	1900	1900	0			
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	1	1	1	1	1	1	1	1

CONTROLS:

	PNEUMATIC	X	ELECTRIC	ELEC'NIC	DDC	COMMENTS
SETPOINTS	CWS (oF)		CWR (oF)	CNWS (oF)	CNWR (oF)	
PANEL INDICATORS						
- PRESSURE	LITE-HI		LITE-LOW	GAUGES		
- TEMPERATURE	LITE-HI		LITE-LOW	GAUGES		
- OTHER						
COMMENTS:						

FIELD SURVEY NOTES

**BUILDING 819
AND TYPICAL FOR
815 THRU 818, AND 827 THRU 831**

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD

BLDG: 819

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 819BLG

VI. BUILDING DATA SURVEY OBSERVATIONS

BLDG NO: 819

BLDG NAME: BARRACKS WITHOUT A/C

ZONE NO.	1	FUNCTION: QUARTERS						
OCCUPANCY HOURS:	M—F	0	TO	2400	SAT	0	TO	2400
	SUN	0	TO	2400				
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F			
	SUMMER OCC	°F		UNOCC	°F			

ZONE NO.			FUNCTION:						
OCCUPANCY HOURS:		M—F		TO		SAT		TO	
		SUN		TO					
PRESENT TEMP	WINTER OCC		°F		UNOCC	°F			
	SUMMER OCC		°F		UNOCC	°F			

ZONE NO.		FUNCTION:							
OCCUPANCY HOURS:		M—F		TO		SAT		TO	
		SUN		TO					
PRESENT TEMP	WINTER OCC		°F		UNOCC	°F			
	SUMMER OCC		°F		UNOCC	°F			

REMARKS: PNEUMATIC CONTROLS; TIMECLOCK PRESENT, BUT HAS NO PINS
THREE ZONES FOR HW BASEBOARD HEATING
TWO LARGE EXHAUST FANS FOR VENTILATION

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
SETPOINTS		PSIG		HW SUPPLY					
RESET CONTROL (oF)	160	HW HIGH	80	HW LOW	60	OA LOW	0	OA HIGH	
BURNER CONTROLS	NA	O2 TRIM (Y/N)		OTHER					
COMMENTS: HAS OA TEMPERATURE RESET CONTROL									

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
SETPOINTS		PSIG		HW SUPPLY					
RESET CONTROL (oF)	160	HW HIGH	80	HW LOW	60	OA LOW	0	OA HIGH	
BURNER CONTROLS	NA	O2 TRIM (Y/N)		OTHER					
COMMENTS: HAS OA TEMPERATURE RESET CONTROL									

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 819

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: KC

CHECKED BY: CEL

FILE: 819EF1

AIR HANDLING UNIT SURVEY OBSERVATIONS

EF-1	AHU NO.	MR-1	LOCATION (RM)
NA	REF. SYS. SERVING AHU	HALF	SERVES AREA

UNIT TYPE:

SINGLE ZN	2-PIPE FC	4-PIPE FC	UNIT HTR	H&V
MULTIZONE	DOUBLE DT	REHEAT	INDUCTION	VAV
NUMBER OF ZONES	EXH. FAN	OTHER		
COMMENT:				

NAMEPLATE:

PEERLE	MFG.	600	MODEL
NA	SUPPLY FAN HP	MFG.	NA
20.0	RET/EXH FAN HP	GE	5K4286A22
CFM-HTG	CFM-CLG	MIN %OA	MAX %OA
			% HTG AREA SERVED
COMMENT:			

COILS:

X	NONE	STM	HW	ELEC	MOD VLV	PREHEAT
X	NONE	STM	HW	ELEC	MOD VLV	HEATING
X	NONE	STM	HW	ELEC	MOD VLV	REHEAT
X	NONE	STM	HW	ELEC	MOD VLV	HUMID.
X	NONE	DX	CW		MOD VLV	COOLING

OPERATION:

HOURS ON:		S	M	T	W	T	F	S	COMMENTS		
PRESENT START TIME		0	0	0	0	0	0	0	TIMECLOCK NO		
PRESENT STOP TIME		2400	2400	2400	2400	2400	2400	2400			
REQUIRED START TIME		0	0	0	0	0	0	0			
REQUIRED STOP TIME		2400	2400	2400	2400	2400	2400	2400			
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
				1	1	1	1				

CONTROLS:

	PNEUMATIC	ELECTRIC	ELEC'NIC	DDC	COMMENTS
THERMOSTAT TYPE:	SINGLE STPT	DUAL SETPNT	SETBACK		NO CONTROL
SPACE SETPOINT (oF):	OCC HEAT	UNOCC HEAT	OCC COOL	UNOCC COOL	
OTHER SETPOINTS (oF):	HOT DECK	COLD DECK	MIXED AIR	OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	N	MAX OA (Y/N)	N
	N	MA CONTROL	N	ECONO-DB	N
				ECONO-ENT	
DEMAND LIMIT:	Y	YES		NO	
COMMENTS:					

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 819

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: KC

CHECKED BY: CEL

FILE: 819EF2

AIR HANDLING UNIT SURVEY OBSERVATIONS

EF-2	AHU NO.	MR-2	LOCATION (RM)
NA	REF. SYS. SERVING AHU	HALF	SERVES AREA

UNIT TYPE:

SINGLE ZN	2-PIPE FC	4-PIPE FC	UNIT HTR	H&V
MULTIZONE	DOUBLE DT	REHEAT	INDUCTION	VAV
NUMBER OF ZONES	EXH. FAN	OTHER		
COMMENT:				

NAMEPLATE:

PEERLE	MFG.	600	MODEL
NA	SUPPLY FAN HP	MFG.	NA
20.0	RET/EXH FAN HP	GE	5K4286A22
CFM-HTG	CFM-CLG	MIN %OA	MAX %OA
			% HTG AREA SERVED

COMMENT:

COILS:

X	NONE	STM	HW	ELEC	MOD VLV	PREHEAT
X	NONE	STM	HW	ELEC	MOD VLV	HEATING
X	NONE	STM	HW	ELEC	MOD VLV	REHEAT
X	NONE	STM	HW	ELEC	MOD VLV	HUMID.
X	NONE	DX	CW		MOD VLV	COOLING

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENTS
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	NO
REQUIRED START TIME	0	0	0	0	0	0	0	
REQUIRED STOP TIME	2400	2400	2400	2400	2400	2400	2400	

MONTHS ON:

J	F	M	A	M	J	J	A	S	O	N	D
				1	1	1	1				

CONTROLS:

	PNEUMATIC	ELECTRIC	ELEC'NIC	DDC	COMMENTS
THERMOSTAT TYPE:	SINGLE STPT	DUAL SETPNT	SETBACK		NO CONTROLS
SPACE SETPOINT (oF):	OCC HEAT	UNOCC HEAT	OCC COOL	UNOCC COOL	
OTHER SETPOINTS (oF):	HOT DECK	COLD DECK	MIXED AIR	OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	N	MAX OA (Y/N)	N
	N	MA CONTROL	N	ECONO-DB	N
DEMAND LIMIT:	Y	YES		NO	

COMMENTS:

FIELD SURVEY NOTES

BUILDING 826

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD

BLDG: 826

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 826BLG

VI. BUILDING DATA SURVEY OBSERVATIONS

BLDG NO: 826 BLDG NAME: GYMNASIUM

ZONE NO.	1	FUNCTION: GYMNASIUM							
OCCUPANCY HOURS:		M—F	430	TO	2000	SAT	1200	TO	1700
		SUN	1200	TO	1700				
PRESENT TEMP	WINTER OCC	°F			UNOCC	°F			
	SUMMER OCC	°F			UNOCC	°F			

ZONE NO.	FUNCTION:								
OCCUPANCY HOURS:		M-F		TO		SAT		TO	
		SUN		TO					
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F				
	SUMMER OCC	°F		UNOCC	°F				

ZONE NO.	FUNCTION:								
OCCUPANCY HOURS:		M-F		TO		SAT		TO	
		SUN		TO					
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F				
	SUMMER OCC	°F		UNOCC	°F				

REMARKS:

CONTROLS:

FILE: 826HV2

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (°F):	69	OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (°F):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)		EA (Y/N)	
		MA CONTROL		ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:		YES	X	NO					
COMMENTS:	T-STAT COVERS LOCKED								

LOCATION: FT. LEONARD WOOD BLDG: 826

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: **KBC**

CHECKED BY: CEL

FILE: 826HV3

AIR HANDLING UNIT SURVEY OBSERVATIONS

HV-3	AHU NO.	MAIN GYM NE	LOCATION (RM)
	REF. SYS. SERVING AHU	MAIN GYM	SERVES AREA

UNIT TYPE:

X	SINGLE ZN		2-PIPE FC		4-PIPE FC		UNIT HTR	X	H&V
	MULTIZONE		DOUBLE DT		REHEAT		INDUCTION		VAV
1	NUMBER OF ZONES				OTHER				
	COMMENT:								

NAMEPLATE:

					MFG.					MODEL
1.5	SUPPLY FAN HP				MFG.					MODEL
	RET/EXH FAN HP				MFG.					MODEL
8500	CFM – HTG		CFM – CLG	100%	MIN %OA	100%	MAX %OA	20.0%	% HTG AREA SERVED	

COMMENT: UNIT NOT ACCESSIBLE EXCEPT BY A VERY TALL LADDER

COILS:

X	NONE		STM		HW		ELEC		MOD VLV	PREHEAT
	NONE		STM	X	HW		ELEC	X	MOD VLV	HEATING
X	NONE		STM		HW		ELEC		MOD VLV	REHEAT
X	NONE		STM		HW		EVAP MEDIA		MOD VLV	HUMID.
X	NONE		DX		CW				MOD VLV	COOLING

OPERATION:

[illegible]

MONTHS ON:

[illegible]

CONTROLS:

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (°F):	69	OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (°F):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)		EA (Y/N)	
		MA CONTROL		ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:		YES	X	NO					

COMMENTS: T-STAT COVERS LOCKED

FILE: 826HV4

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (°F):	69	OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (°F):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)		EA (Y/N)	
		MA CONTROL		ECONO – DB		ECONO – ENT		OTHER	
DEMAND LIMIT:		YES	X	NO					
COMMENTS: T – STAT COVERS LOCKED									

LOCATION: FT. LEONARD WOOD BLDG: 826

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: KBC

CHECKED BY: CEL

FILE: 826HV5

AIR HANDLING UNIT SURVEY OBSERVATIONS

HV-5	AHU NO.	EXERCISE RM.	LOCATION (RM)
	REF. SYS. SERVING AHU	EXERCISE RM. / HANDBALL	SERVES AREA

UNIT TYPE:

X	SINGLE ZN		2-PIPE FC		4-PIPE FC		UNIT HTR	X	H&V
	MULTIZONE		DOUBLE DT		REHEAT		INDUCTION		VAV
1	NUMBER OF ZONES				OTHER				
	COMMENT:								

NAMEPLATE:

					MFG.						MODEL
1.5	SUPPLY FAN HP				MFG.						MODEL
	RET/EXH FAN HP				MFG.						MODEL
8500	CFM-HTG		CFM-CLG	100%	MIN %OA	100%	MAX %OA	20.0%	% HTG AREA SERVED		

COMMENT: UNIT NOT ACCESSIBLE EXCEPT BY A VERY TALL LADDER

COILS:

X	NONE		STM		HW		ELEC		MOD VLV	PREHEAT
	NONE		STM	X	HW		ELEC	X	MOD VLV	HEATING
X	NONE		STM		HW		ELEC		MOD VLV	REHEAT
X	NONE		STM		HW		EVAP MEDIA		MOD VLV	HUMID.
X	NONE		DX		CW				MOD VLV	COOLING

OPERATION:

[illegible]

MONTHS ON:

[illegible]

CONTROLS:

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (°F):	72	OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (°F):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)		EA (Y/N)	
		MA CONTROL		ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:		YES	X	NO					

COMMENTS: T-STAT COVERS LOCKED

FIELD SURVEY NOTES

BUILDING 837

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD

BLDG: 837

EMC NO.: #3204-000

DATE: Apr-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 837BLG

VI. BUILDING DATA SURVEY OBSERVATIONS

BLDG NO: 837 BLDG NAME: BAND TRAINING

ZONE NO.	1		FUNCTION: BAND TRAINING						
OCCUPANCY HOURS:	M-F	700	TO	1700	SAT	0	TO	0	
	SUN	0	TO	0					
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F				
	SUMMER OCC	°F		UNOCC	°F				

ZONE NO.		FUNCTION:							
OCCUPANCY HOURS:		M-F		TO		SAT		TO	
		SUN		TO					
PRESENT TEMP	WINTER OCC		°F		UNOCC	°F			
	SUMMER OCC		°F		UNOCC	°F			

ZONE NO.		FUNCTION:							
OCCUPANCY HOURS:		M—F		TO		SAT		TO	
		SUN		TO					
PRESENT TEMP	WINTER OCC		°F		UNOCC	°F			
	SUMMER OCC		°F		UNOCC	°F			

REMARKS: SIMILAR TO BUILDING 1750

AHUs HAVE PNEUMATIC ACTUATORS, R.A. AND O.A. DAMPERS SHARE ONE ACTUATOR
HV's HAVE FACE AND BYPASS DAMPERS, TWO HEATING CONTROL VALVES

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			TIMECLOCK HAS NO PINS
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)	N	EA (Y/N)	
		MA CONTROL		ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:	Y	YES		NO					
COMMENTS: BARBER COLEMAN CONTROLS, ELECTRIC VALVE ACTUATORS, HOA									

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 837

EMC NO.: #3204-000

DATE: Apr-93

PREPARED BY:

CHECKED BY: CEL

FILE: 837AH2

AIR HANDLING UNIT SURVEY OBSERVATIONS

AHU-2	AHU NO.	ATTIC EAST	LOCATION (RM)
C.P.	REF. SYS. SERVING AHU	DINING ROOM	SERVES AREA

UNIT TYPE:

X	SINGLE ZN	2-PIPE FC	4-PIPE FC	UNIT HTR	H&V
	MULTIZONE	DOUBLE DT	REHEAT	INDUCTION	VAV
	NUMBER OF ZONES	OTHERS			
	COMMENT:				

NAMEPLATE:

N/A	MFG.	MODEL
15.0 SUPPLY FAN HP	CENTURY	MFG. 323576-03
RET/EXH FAN HP	MFG.	MODEL
2800 CFM-HTG	2800 CFM-CLG	10% MIN %OA
		100% MAX %OA
		50% % HTG AREA SERVED
COMMENT:	(SF) 200	

COILS:

X	NONE	STM	HW	ELEC	MOD VLV	PREHEAT
	NONE	STM	X	HW	ELEC	X
X	NONE	STM	HW	ELEC	MOD VLV	REHEAT
X	NONE	STM	HW	ELEC	MOD VLV	HUMID.
	NONE	DX	X	CW	MOD VLV	COOLING

OPERATION:

HOURS ON:		S	M	T	W	T	F	S	COMMENTS		
PRESENT START TIME		0	0	0	0	0	0	0	TIMECLOCK?		
PRESENT STOP TIME		2400	2400	2400	2400	2400	2400	2400	YES, NO PINS		
REQUIRED START TIME		0	700	700	700	700	700	0			
REQUIRED STOP TIME		0	1700	1700	1700	1700	1700	0			
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	1	1	1	1	1	1	1	1

CONTROLS:

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)	N	EA (Y/N)	
		MA CONTROL		ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:	Y	YES		NO					
COMMENTS: BARBER									

FILE: 837CV1

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
SETPOINTS		PSIG		HW SUPPLY					
RESET CONTROL (oF)		HW HIGH		HW LOW		OA LOW		OA HIGH	
BURNER CONTROLS		O2 TRIM (Y/N)		OTHER					
COMMENTS:									

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 837

EMC NO.: #3204-000

DATE: Apr-93

PREPARED BY: PG/wtc

CHECKED BY: CEL

FILE: 837PMP

REFRIGERATION EQUIPMENT SURVEY OBSERVATIONS

CHW PUMP	CHILLER/COMPRESSOR NO.	MECH. ROOM	LOCATION (RM)

UNIT TYPE:

	CENTRIFUGAL WITH WATER SIDE COOLING TOWER		OTHER
	RECIPROCATING WITH WATER SIDE COOLING TOWER		AHU'S SERVED
	RECIPROCATING WITH AIR COOLED CONDENSING UNIT		
	ABSORPTION WITH WATER SIDE COOLING TOWER		
	AIR COOLED CONDENSING UNIT		
CHW		DX	X OTHER
			CHW PUMP ONLY

NAMEPLATE:

CHILLER	MFG.		MODEL		SERIAL NO.
	VOLTS	AMPS	PH	HZ	CAPACITY (TONS)
TOWER	MFG.		MODEL		# OF FANS
	VOLTS	AMPS	PH	HZ	HP
CW PUMHOWELL	MFG.	2247ADS	MODEL		SERIAL NO.
208	VOLTS	13	AMPS	3	PH
			60	HZ	5
					HP
CNW PUMP	MFG.		MODEL		SERIAL NO.
	VOLTS	AMPS	PH	HZ	HP

COMMENTS:

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENT
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	
REQUIRED START TIME	0	700	700	700	700	700	0	
REQUIRED STOP TIME	0	1700	1700	1700	1700	1700	0	

MONTHS ON:

J	F	M	A	M	J	J	A	S	O	N	D
0	0	0	0	1	1	1	1	1	0	0	0

CONTROLS:

	PNEUMATIC	ELECTRIC	ELEC'NIC	DDC	COMMENTS
SETPOINTS	CWS (oF)	CWR (oF)	CNWS (oF)	CNWR (oF)	NONE
PANEL INDICATORS					
- PRESSURE	LITE-HI	LITE-LOW	GAUGES		
- TEMPERATURE	LITE-HI	LITE-LOW	GAUGES		
- OTHER					

COMMENTS:

/wtc

FIELD SURVEY NOTES

BUILDING 844

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD

BLDG: 844

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 844BLG

VI. BUILDING DATA SURVEY OBSERVATIONS

BLDG NO: 844 BLDG NAME: BRIGADE HQ

ZONE NO.	1	FUNCTION: ADMINISTRATION						
OCCUPANCY HOURS:	M-F	700	TO	1700	SAT	0	TO	0
	SUN	0	TO	0				
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F			
	SUMMER OCC	°F		UNOCC	°F			

ZONE NO.	FUNCTION:							
OCCUPANCY HOURS:	M-F		TO		SAT		TO	
	SUN		TO					
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F			
	SUMMER OCC	°F		UNOCC	°F			

ZONE NO.	FUNCTION:							
OCCUPANCY HOURS:	M-F		TO		SAT		TO	
	SUN		TO					
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F			
	SUMMER OCC	°F		UNOCC	°F			

REMARKS:

FILE: 844FC1

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:	X	SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (°F):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (°F):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:		MIN OA (Y/N)		MAX OA (Y/N)		RA (Y/N)		EA (Y/N)	
		MA CONTROL		ECONO – DB		ECONO – ENT		OTHER	
DEMAND LIMIT:		YES	X	NO					
COMMENTS:									

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 844

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 844RAD1

PERIMETER RADIATION SURVEY OBSERVATIONS

RAD-1	PER RAD NO.	BASM., 1, & 2 FLOORS	LOCATION (RM)
CV-1	SOURCE OF HEATING	STAIRWELLS & STORAGE	SERVES AREA

UNIT TYPE:

STEAM	X	HW	ELECTRIC
OTHER			
COMMENT:			

NAMEPLATE:

HW PUMP 1 - HP	MFG.	MODEL
HW PUMP 2 - HP	MFG.	MODEL
HW PUMP 3 - HP	MFG.	MODEL
HW PUMP 4 - HP	MFG.	MODEL
COMMENT:	30.0%	% AREA HEATING

OPERATION:

HOURS ON:		S	M	T	W	T	F	S	COMMENT		
PRESENT START TIME		0	0	0	0	0	0	0	TIMECLOCK?		
PRESENT STOP TIME		2400	2400	2400	2400	2400	2400	2400			
REQUIRED START TIME		0	700	700	700	700	700	0			
REQUIRED STOP TIME		0	1700	1700	1700	1700	1700	0			
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1						1	1	1

CONTROLS:

	PNEUMATIC	ELECTRIC	ELEC'NIC	DDC	COMMENTS
RADIATION CONTROL	NONE	2-WAY VLV	3-WAY VLV	OTHER	
SPACE SETPOINT (°F):	OCC HEAT	UNOCC HEAT	OCC COOL	UNOCC COOL	
RESET CONTROL (°F):	HW HIGH	HW LOW	OA LOW	OA HIGH	
COMMENTS:					

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 844

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 844CH1

REFRIGERATION EQUIPMENT SURVEY OBSERVATIONS

CH-1	CHILLER/COMPRESSOR NO.	MECH. ROOM	LOCATION (RM)

UNIT TYPE:

	CENTRIFUGAL WITH WATER SIDE COOLING TOWER		OTHER
	RECIPROCATING WITH WATER SIDE COOLING TOWER	X	AHU'S SERVED FC-1
X	RECIPROCATING WITH AIR COOLED CONDENSING UNIT		
	ABSORPTION WITH WATER SIDE COOLING TOWER		
	AIR COOLED CONDENSING UNIT		
X	CHW	DX	OTHER

NAMEPLATE:

CHILLER	TSI	MFG.	CAUCS25			MODEL	7819			SERIAL NO.	
230	VOLTS	88.5	AMPS	3	PH	60	HZ	21.3	CAPACITY (TONS)		
TOWER		MFG.				MODEL				2	# OF FANS
230	VOLTS	4.6	AMPS	3	PH	60	HZ	1	HP		
CW PUMP		MFG.				MODEL				SERIAL NO.	
	VOLTS		AMPS		PH		HZ	1.5	HP		
CNW PUMP		MFG.				MODEL				SERIAL NO.	
	VOLTS		AMPS		PH		HZ		HP		

COMMENTS:

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENT
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	YES, NO PINS
REQUIRED START TIME	0	700	700	700	700	700	0	
REQUIRED STOP TIME	0	1700	1700	1700	1700	1700	0	

MONTHS ON:

J	F	M	A	M	J	J	A	S	O	N	D
0	0	0	0	1	1	1	1	1	0	0	0

CONTROLS:

	PNEUMATIC	X	ELECTRIC	ELEC'NIC	DDC	COMMENTS
SETPOINTS	CWS (oF)		CWR (oF)	CNWS (oF)	CNWR (oF)	
PANEL INDICATORS						
- PRESSURE	LITE-HI		LITE-LOW	GAUGES		
- TEMPERATURE	LITE-HI		LITE-LOW	GAUGES		
- OTHER						

COMMENTS: FM RADIO CONTROL SWITCH INSTALLED

	X	PNEUMATIC	ELECTRIC	ELEC'NIC	DDC	COMMENTS
SETPOINTS		PSIG	HW SUPPLY			
RESET CONTROL (oF)		HW HIGH	HW LOW	OA LOW	OA HIGH	
BURNER CONTROLS		O2 TRIM (Y/N)	OTHER			
COMMENTS:	HAS O.A. TEMPERATURE RESET					
	MANUAL SUMMER/WINTER CHANGEOVER					
	BLDG UNDER RENOVATION. WILL HAVE NEW FAN COILS					

COMMENTS:

FIELD SURVEY NOTES

BUILDING 1012
1013 THRU 1016, 1028, AND 1029

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD

BLDG: 1012

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 1012BLG

VI. BUILDING DATA SURVEY OBSERVATIONS

BLDG NO: 1012 BLDG NAME: BARRACKS WITH A/C

ZONE NO.	1		FUNCTION: QUARTERS						
OCCUPANCY HOURS:	M—F	0	TO	2400	SAT	0	TO	2400	
	SUN	0	TO	2400					
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F				
	SUMMER OCC	°F		UNOCC	°F				

ZONE NO.			FUNCTION:						
OCCUPANCY HOURS:		M—F		TO		SAT		TO	
		SUN		TO					
PRESENT TEMP	WINTER OCC		°F		UNOCC	°F			
	SUMMER OCC		°F		UNOCC	°F			

ZONE NO.		FUNCTION:							
OCCUPANCY HOURS:		M—F		TO		SAT		TO	
		SUN		TO					
PRESENT TEMP	WINTER OCC		°F		UNOCC	°F			
	SUMMER OCC		°F		UNOCC	°F			

REMARKS: SIMILAR IN CONSTRUCTION TO BLDG 627
FAN COIL UNITS PROVIDE HEATING AND COOLING

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 1012

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: cel

CHECKED BY: CEL

FILE: 1012FC1

AIR HANDLING UNIT SURVEY OBSERVATIONS

FC-1	AHU NO.	SOUTH	LOCATION (RM)
C.PLANT	REF. SYS. SERVING AHU	SOUTH	SERVES AREA

UNIT TYPE:

SINGLE ZN	X	2-PIPE FC	4-PIPE FC	UNIT HTR	H&V
MULTIZONE		DOUBLE DT	REHEAT	INDUCTION	VAV
NUMBER OF ZONES	40	OTHER	FAN COILS TOTAL		
COMMENT:					

NAMEPLATE:

NA	MFG.	NA	MODEL
4.0 SUPPLY FAN HP	NA	MFG.	NA
RET/EXH FAN HP	MFG.		MODEL
9640 CFM-HTG	9640 CFM-CLG	10% MIN %OA	10% MAX %OA
		40.0%	% HTG AREA SERVED
COMMENT:			

COILS:

X	NONE	STM	HW	ELEC	MOD VLV	PREHEAT
	NONE	STM	X	HW	ELEC	MOD VLV
X	NONE	STM	HW	ELEC	MOD VLV	REHEAT
X	NONE	STM	HW	EVAP MEDIA	MOD VLV	HUMID.
	NONE	DX	X	CW	MOD VLV	COOLING

OPERATION:

HOURS ON:		S	M	T	W	T	F	S	COMMENTS		
PRESENT START TIME		0	0	0	0	0	0	0	TIMECLOCK?		
PRESENT STOP TIME		2400	2400	2400	2400	2400	2400	2400			
REQUIRED START TIME		0	0	0	0	0	0	0			
REQUIRED STOP TIME		2400	2400	2400	2400	2400	2400	2400			
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	1	1	1	1	1	1	1	1

CONTROLS:

	PNEUMATIC	X	ELECTRIC	ELEC'NIC	DDC	COMMENTS
THERMOSTAT TYPE:	SINGLE STPT		DUAL SETPNT	SETBACK		
SPACE SETPOINT (°F):	OCC HEAT		UNOCC HEAT	OCC COOL	UNOCC COOL	
OTHER SETPOINTS (°F):	HOT DECK		COLD DECK	MIXED AIR	OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	N	MAX OA (Y/N)	N	RA (Y/N)
		MA CONTROL		ECONO-DB		ECONO-ENT
DEMAND LIMIT:	X	YES		NO		
COMMENTS:						

FILE: 1012FC2

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (°F):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (°F):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	N	MAX OA (Y/N)	N	RA (Y/N)	N	EA (Y/N)	
		MA CONTROL		ECONO – DB		ECONO – ENT		OTHER	
DEMAND LIMIT:	X	YES		NO					
COMMENTS:									

FILE: 1012FC3

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (°F):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (°F):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	N	MAX OA (Y/N)	N	RA (Y/N)	N	EA (Y/N)	
		MA CONTROL		ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:	X	YES		NO					
COMMENTS:									

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 1012

EMC NO.: #3204.000

DATE: Mar-93

PREPARED BY: BS

CHECKED BY: CEL

FILE: 1012CV1

BOILER & CONVERTER SURVEY OBSERVATIONS

CV1	BOILER/CONVERTER NO.	MER	LOCATION (RM)
C.PLANT	SOURCE OF HEATING (PLANT)		SERVES AREA

UNIT TYPE:

	STEAM		PSIG		HW		TEMP.		BOILER TYPE:
	NO.2 OIL		NO.6 OIL		N.GAS		ELEC		FUELS:
	STM/HW	X	HTHW/HW		HTHW/STM		OTHER		CONVERTER TYPE:
X	SPACE HEAT		DHW		OTHER				USE:
COMMENT:							0%	% HTG AREA SERVED	
								BB RADIATION ONLY	

NAMEPLATE:

NA		MFG.	NA	MODEL	688790	CAPACITY OUTPUT (BTUH)
					688790	CAPACITY INPUT (BTUH)
		MFG.		MODEL		CAPACITY OUTPUT (BTUH)
						CAPACITY INPUT (BTUH)
0.75	HW PUMP 1 – HP	MOTOR – RELIANCE		MFG.	P14G319M – BU	MODEL
	HW PUMP 2 – HP			MFG.		MODEL
	HW PUMP 3 – HP			MFG.		MODEL
COMMENT:						

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENT			
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?			
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	NO			
REQUIRED START TIME	0	0	0	0	0	0	0				
REQUIRED STOP TIME	2400	2400	2400	2400	2400	2400	2400				
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1							1	1	1

CONTROLS:

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
SETPOINTS		PSIG	135	HW SUPPLY					
RESET CONTROL (oF)		HW HIGH		HW LOW		OA LOW		OA HIGH	
BURNER CONTROLS		O2 TRIM (Y/N)		OTHER					
COMMENTS:									

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
SETPOINTS		PSIG	135	HW SUPPLY					
RESET CONTROL (oF)		HW HIGH		HW LOW		OA LOW		OA HIGH	
BURNER CONTROLS		O2 TRIM (Y/N)		OTHER					
COMMENTS:									

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
SETPOINTS		PSIG	135	HW SUPPLY					
RESET CONTROL (oF)		HW HIGH		HW LOW		OA LOW		OA HIGH	
BURNER CONTROLS		O2 TRIM (Y/N)		OTHER					
COMMENTS:									

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
SETPOINTS		PSIG	135	HW SUPPLY					
RESET CONTROL (oF)		HW HIGH		HW LOW		OA LOW		OA HIGH	
BURNER CONTROLS		O2 TRIM (Y/N)		OTHER					
COMMENTS:									

FIELD SURVEY NOTES

BUILDING 1025

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD

BLDG: 1025

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 1025BLG

VI. BUILDING DATA SURVEY OBSERVATIONS

BLDG NO: 1025 BLDG NAME: ADMINISTRATION/SUPPLY

ZONE NO.	1	FUNCTION: COMPANY ADMINISTRATION / SUPPLY					
OCCUPANCY HOURS:	M-F	500	TO	1700	SAT	500	TO 1700
	SUN	500	TO	1700			
PRESENT TEMP	WINTER OCC	°F	UNOCC	°F			
	SUMMER OCC	°F	UNOCC	°F			

ZONE NO.		FUNCTION:					
OCCUPANCY HOURS:	M-F		TO		SAT		TO
	SUN		TO				
PRESENT TEMP	WINTER OCC	°F	UNOCC	°F			
	SUMMER OCC	°F	UNOCC	°F			

ZONE NO.		FUNCTION:					
OCCUPANCY HOURS:	M-F		TO		SAT		TO
	SUN		TO				
PRESENT TEMP	WINTER OCC	°F	UNOCC	°F			
	SUMMER OCC	°F	UNOCC	°F			

REMARKS: SAME AS BUILDING 655 , EXCEPT ADMINISTRATION OFFICES HAVE A/C

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)	N	EA (Y/N)	
		MA CONTROL		ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:		YES	N	NO					
COMMENTS:									

		PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
RADIATION CONTROL	X	NONE		2-WAY VLV		3-WAY VLV		OTHER	
SPACE SETPOINT (°F):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
RESET CONTROL (°F):		HW HIGH		HW LOW		OA LOW		OA HIGH	
COMMENTS:									

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
SETPOINTS		PSIG		HW SUPPLY					
RESET CONTROL (oF)		HW HIGH		HW LOW		OA LOW		OA HIGH	
BURNER CONTROLS		O2 TRIM (Y/N)		OTHER					
COMMENTS: ELEC. ACTUATOR									
O.A. TEMPERATURE CUT OFF ABOVE 65 °F									

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 1025

EMC NO.: #3204.000

DATE: Mar-93

PREPARED BY: **AJN**

CHECKED BY: CEL

FILE: 1025DHW1

DOMESTIC HW SURVEY OBSERVATIONS

DHW-1	BOILER/CONVERTER NO.	MECH RM	LOCATION (RM)
ELEC.	SOURCE OF HEATING (PLANT)	ALL	SERVES AREA

UNIT TYPE:

	NO.2 OIL		NO.6 OIL		N.GAS	X	ELEC		FUELS:
	STM/HW		HTHW/HW		HTHW/STM		OTHER		CONVERTER TYPE:

COMMENT:

NAMEPLATE:

STATE	MFG.	MODEL	4700	CAPACITY OUTPUT (WATTS)
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	MFG.		MODEL		CAPACITY OUTPUT (BTUH)

DOMESTIC HW CIRCULATION PUMP: YES

0.083	HW PUMP 1 – HP	BELL & GOSSETT	MFG.		MODEL
	HW PUMP 2 – HP		MFG.		MODEL
	HW PUMP 3 – HP		MFG.		MODEL

COMMENT:

DIMENSION:	30	DIAMETER (INCHES)	60	HEIGHT OR LENGTH (INCHES)	82 GALLON
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OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENT
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	NO
REQUIRED START TIME	0	500	500	500	500	500	0	
REQUIRED STOP TIME	0	1700	1700	1700	1700	1700	0	

MONTHS ON:

[illegible]

CONTROLS:

		PNEUMATIC	X	ELECTRIC		ELECTRIC		DDC	COMMENTS
SETPOINTS				HW SUPPLY					

COMMENTS:

FIELD SURVEY NOTES

BUILDING 1350

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD

BLDG: 1350

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 1350BLG

VI. BUILDING DATA SURVEY OBSERVATIONS

BLDG NO: 1350 BLDG NAME: RESERVE CENTER

ZONE NO.	1	FUNCTION: KITCHEN / DINING					
OCCUPANCY HOURS:	M-F	500	TO	1900	SAT	500	TO 1900
	SUN	500	TO	1900			
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F		
	SUMMER OCC	°F		UNOCC	°F		

ZONE NO.	2	FUNCTION: OFFICES / CLASSROOMS					
OCCUPANCY HOURS:	M-F	700	TO	1800	SAT	0	TO 0
	SUN	0	TO	0			
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F		
	SUMMER OCC	°F		UNOCC	°F		

ZONE NO.		FUNCTION:					
OCCUPANCY HOURS:	M-F		TO		SAT		TO
	SUN		TO				
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F		
	SUMMER OCC	°F		UNOCC	°F		

REMARKS:

COMMENTS: ON/OFF CONTROLS

FILE: 1350AH3

CONTROLS:									
	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:	X	SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):	75	HOT DECK	65	COLD DECK	65	MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)	Y	EA (Y/N)	
	Y	MA CONTROL	Y	ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:	Y	(Y / N)							
COMMENTS:	BARBER COLMAN CONTROLS; ZONE CONTROL SET TO 70 °F								

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 1350

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 1350AH4

AIR HANDLING UNIT SURVEY OBSERVATIONS

AHU-4	AHU NO.	ROOF	LOCATION (RM)
BLR-1	REF. SYS. SERVING AHU	DINING AREA	SERVES AREA

UNIT TYPE:

SINGLE ZN	2-PIPE FC	4-PIPE FC	UNIT HTR	X	H&V
MULTIZONE	DOUBLE DT	REHEAT	INDUCTION		VAV
NUMBER OF ZONES	OTHER				
COMMENT:					

NAMEPLATE:

TRANE					MFG.					MODEL
3.0	SUPPLY FAN HP		MARATHON		MFG.					MODEL
	RET/EXH FAN HP				MFG.					MODEL
3720	CFM – HTG	0	CFM – CLG	18%	MIN %OA	100%	MAX %OA	12.6%	% HTG AREA SERVED	

COMMENT:

COILS:

X	NONE		STM		HW		ELEC		MOD VLV	PREHEAT
	NONE		STM	X	HW		ELEC		MOD VLV	HEATING
X	NONE		STM		HW		ELEC		MOD VLV	REHEAT
X	NONE		STM		HW		ELEC		MOD VLV	HUMID.
X	NONE		DX		CW				MOD VLV	COOLING

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENTS
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	NO
REQUIRED START TIME	700	700	700	700	700	700	700	
REQUIRED STOP TIME	1900	1900	1900	1900	1900	1900	1900	

MONTHS ON:

J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	1	1	1	1	1	1	1	1

CONTROLS:

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)	N	EA (Y/N)	
	Y	MA CONTROL	Y	ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:	Y	(Y / N)							

COMMENTS:

FILE: 1350AH5

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)	N	EA (Y/N)	
	N	MA CONTROL	Y	ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:	Y	(Y / N)							
COMMENTS:									

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
SETPOINTS		PSIG		HW SUPPLY					
RESET CONTROL (oF)		HW HIGH		HW LOW		OA LOW		OA HIGH	
BURNER CONTROLS		O2 TRIM (Y/N)		OTHER					
COMMENTS: HW PUMP WILL START WHEN TEMPERATURE IS BELOW 65 °F									

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 1350

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 1350CH1

REFRIGERATION EQUIPMENT SURVEY OBSERVATIONS

ACCU-3	CHILLER/COMPRESSOR NO.	ROOF	LOCATION (RM)

UNIT TYPE:

	CENTRIFUGAL WITH WATER SIDE COOLING TOWER		OTHER
	RECIPROCATING WITH WATER SIDE COOLING TOWER	X	AHU'S SERVED AHU-3
	RECIPROCATING WITH AIR COOLED CONDENSING UNIT		
	ABSORPTION WITH WATER SIDE COOLING TOWER		
X	AIR COOLED CONDENSING UNIT		
	CHW	X	DX
			OTHER

NAMEPLATE:

CHILLER	TRANE	MFG.	BTA120C300MB	MODEL	B05196238	SERIAL NO.
230	VOLTS	37	MCA	3	PH	60
						HZ
						10
						CAPACITY (TONS)
CONDENSER FANS	MFG.			MODEL		2
						# OF FANS
230	VOLTS	3.8	AMPS	1	PH	60
						HZ
						0.5
						HP
DTW PUMP	MFG.			MODEL		SERIAL NO.
	VOLTS		AMPS		PH	
						HZ
						HP
CNW PUMP	MFG.			MODEL		SERIAL NO.
	VOLTS		AMPS		PH	
						HZ
						HP

COMMENTS:

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENT			
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?			
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400				
REQUIRED START TIME	0	700	700	700	700	700	0				
REQUIRED STOP TIME	0	1800	1800	1800	1800	1800	0				
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
0	0	0	0	1	1	1	1	1	0	0	0

CONTROLS:

	PNEUMATIC	X	ELECTRIC	ELEC'NIC	DDC	COMMENTS
SETPOINTS	CWS (oF)		CWR (oF)	CNWS (oF)	CNWR (oF)	
PANEL INDICATORS						
- PRESSURE	LITE-HI		LITE-LOW	GAUGES		
- TEMPERATURE	LITE-HI		LITE-LOW	GAUGES		
- OTHER						
COMMENTS:						

COMMENTS:

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 1350

EMC NO.: #3204.000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 1350DHW3

DOMESTIC HW SURVEY OBSERVATIONS

DHW-2	BOILER/CONVERTER NO.	MECH RM	LOCATION (RM)
ELEC.	SOURCE OF HEATING (PLANT)	ALL	SERVES AREA

UNIT TYPE:

NO.2 OIL	NO.6 OIL	N.GAS	X	ELEC	FUELS:
STM/HW	HTHW/HW	HTHW/STM		OTHER	CONVERTER TYPE:

COMMENT:

NAMEPLATE:

DURA POWER	MFG.	DVE120	MODEL	30000	CAPACITY OUTPUT (WATTS)
	MFG.		MODEL		CAPACITY OUTPUT (BTUH)

DOMESTIC HW CIRCULATION PUMP: NONE

HW PUMP 1 - HP	MFG.	MODEL
HW PUMP 2 - HP	MFG.	MODEL
HW PUMP 3 - HP	MFG.	MODEL

COMMENT:

DIMENSION:	30	DIAMETER (INCHES)	60	HEIGHT OR LENGTH (INCHES)	120 GALLON
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OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENT
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	NO
REQUIRED START TIME	500	500	500	500	500	500	500	
REQUIRED STOP TIME	2000	2000	2000	2000	2000	2000	2000	

MONTHS ON:

J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	1	1	1	1	1	1	1	1

CONTROLS:

	PNEUMATIC	X	ELECTRIC	ELEC'NIC	DDC	COMMENTS
SETPOINTS			HW SUPPLY			

COMMENTS:

FIELD SURVEY NOTES

BUILDING 1382

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD

BLDG: 1382

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: BHS

CHECKED BY: CEL

FILE: 1382BLG

VI. BUILDING DATA SURVEY OBSERVATIONS

BLDG NO: 1382 BLDG NAME: CAR WASH

ZONE NO.	1	FUNCTION: CAR WASH						
OCCUPANCY HOURS:	M-F	0	TO	0	SAT	0	TO	0
	SUN	0	TO	0				
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F			
	SUMMER OCC	°F		UNOCC	°F			

ZONE NO.	FUNCTION:							
OCCUPANCY HOURS:	M-F		TO		SAT		TO	
	SUN		TO					
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F			
	SUMMER OCC	°F		UNOCC	°F			

ZONE NO.	FUNCTION:							
OCCUPANCY HOURS:	M-F		TO		SAT		TO	
	SUN		TO					
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F			
	SUMMER OCC	°F		UNOCC	°F			

REMARKS:

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 1382

EMC NO.: #3204.000

DATE: Mar-93

PREPARED BY: CEL

CHECKED BY: CEL

FILE: 1382BLR1

BOILER & CONVERTER SURVEY OBSERVATIONS

BLR-1	BOILER/CONVERTER NO.	MER	LOCATION (RM)
	SOURCE OF HEATING (PLANT)	CAR WASH	SERVES AREA

UNIT TYPE:

STEAM	PSIG	X	HW	TEMP.	BOILER TYPE:
NO.2 OIL	NO.6 OIL		N.GAS	ELEC	FUELS:
STM/HW	HTHW/HW		HTHW/STM	OTHER	CONVERTER TYPE:
SPACE HEAT	DHW		OTHER		USE:
COMMENT:				0% % HTG AREA SERVED	
				BB RADIATION ONLY	

NAMEPLATE:

RAYPAK	MFG.		MODEL		CAPACITY OUTPUT (BTUH)
					CAPACITY INPUT (BTUH)
	MFG.		MODEL		CAPACITY OUTPUT (BTUH)
					CAPACITY INPUT (BTUH)
5	HW PUMP 1 - HP	BALDOR	MFG.	M3218T	MODEL
5	HW PUMP 2 - HP	BALDOR	MFG.	M3218T	MODEL
	HW PUMP 3 - HP		MFG.		MODEL
COMMENT:					

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENT			
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?			
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400				
REQUIRED START TIME	0	0	0	0	0	0	0				
REQUIRED STOP TIME	2400	2400	2400	2400	2400	2400	2400				
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	0	0						1	1

CONTROLS:

	PNEUMATIC	ELECTRIC	ELEC'NIC	DDC	COMMENTS
SETPOINTS	PSIG	HW SUPPLY			
RESET CONTROL (oF)	HW HIGH	HW LOW	OA LOW	OA HIGH	
BURNER CONTROLS	O2 TRIM (Y/N)	OTHER			
COMMENTS:					

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 1382

EMC NO.: #3204.000

DATE: Mar-93

PREPARED BY: CEL

CHECKED BY: CEL

FILE: 1382BLR2

BOILER & CONVERTER SURVEY OBSERVATIONS

BLR-2	BOILER/CONVERTER NO.	MER	LOCATION (RM)
	SOURCE OF HEATING (PLANT)	CAR WASH	SERVES AREA

UNIT TYPE:

STEAM	PSIG	X	HW	TEMP.	BOILER TYPE:
NO.2 OIL	NO.6 OIL		N.GAS	ELEC	FUELS:
STM/HW	HTHW/HW		HTHW/STM	OTHER	CONVERTER TYPE:
SPACE HEAT	DHW		OTHER		USE:
COMMENT:				0%	% HTG AREA SERVED
					BB RADIATION ONLY

NAMEPLATE:

RAYPAK		MFG.		MODEL		CAPACITY OUTPUT (BTUH)
						CAPACITY INPUT (BTUH)
		MFG.		MODEL		CAPACITY OUTPUT (BTUH)
						CAPACITY INPUT (BTUH)
5	HW PUMP 1 – HP	BALDOR		MFG.	M3218T	MODEL
5	HW PUMP 2 – HP	BALDOR		MFG.	M3218T	MODEL
	HW PUMP 3 – HP			MFG.		MODEL
COMMENT:						

OPERATION:

HOURS ON:		S	M	T	W	T	F	S	COMMENT		
PRESENT START TIME		0	0	0	0	0	0	0	TIMECLOCK?		
PRESENT STOP TIME		2400	2400	2400	2400	2400	2400	2400			
REQUIRED START TIME		0	0	0	0	0	0	0			
REQUIRED STOP TIME		2400	2400	2400	2400	2400	2400	2400			
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	0	0						1	1

CONTROLS:

	PNEUMATIC	ELECTRIC	ELEC'NIC	DDC	COMMENTS
SETPOINTS	PSIG	HW SUPPLY			
RESET CONTROL (oF)	HW HIGH	HW LOW	OA LOW	OA HIGH	
BURNER CONTROLS	O2 TRIM (Y/N)	OTHER			
COMMENTS:					

FIELD SURVEY NOTES

BUILDING 1383

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD

BLDG: 1383

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 1383BLG

VI. BUILDING DATA SURVEY OBSERVATIONS

BLDG NO: 1383 BLDG NAME: AUTO CRAFT SHOP

ZONE NO.	1	FUNCTION: AUTO CRAFT SHOP						
OCCUPANCY HOURS:	M-F	1100	TO	1900	SAT	1000	TO	1700
	SUN	1000	TO	1700				
PRESENT TEMP	WINTER OCC		°F	UNOCC	°F			
	SUMMER OCC		°F	UNOCC	°F			

ZONE NO.		FUNCTION:						
OCCUPANCY HOURS:	M-F		TO		SAT		TO	
	SUN		TO					
PRESENT TEMP	WINTER OCC		°F	UNOCC	°F			
	SUMMER OCC		°F	UNOCC	°F			

ZONE NO.		FUNCTION:						
OCCUPANCY HOURS:	M-F		TO		SAT		TO	
	SUN		TO					
PRESENT TEMP	WINTER OCC		°F	UNOCC	°F			
	SUMMER OCC		°F	UNOCC	°F			

REMARKS:

FILE: 1383UH1

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (°F):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (°F):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	N	MAX OA (Y/N)	N	RA (Y/N)	N	EA (Y/N)	
		MA CONTROL		ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:	N	(Y/N)		NO					
COMMENTS:									

COMMENTS:

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (°F):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (°F):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	N	MAX OA (Y/N)	N	RA (Y/N)	N	EA (Y/N)	
		MA CONTROL		ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:	N	(Y/N)		NO					
COMMENTS:									

FILE: 1383UH6

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (°F):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (°F):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	N	MAX OA (Y/N)	N	RA (Y/N)	N	EA (Y/N)	
		MA CONTROL		ECONO – DB		ECONO – ENT		OTHER	
DEMAND LIMIT:	N	(Y/N)		NO					
COMMENTS:									

FILE: 1383UH7

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (°F):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (°F):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	N	MAX OA (Y/N)	N	RA (Y/N)	N	EA (Y/N)	
		MA CONTROL		ECONO – DB		ECONO – ENT		OTHER	
DEMAND LIMIT:	N	(Y/N)		NO					
COMMENTS:									

FIELD SURVEY NOTES

BUILDING 1390

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD

BLDG: 1390

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 1390BLG

VI. BUILDING DATA SURVEY OBSERVATIONS

BLDG NO: 1390 BLDG NAME: RESERVE MOTOR POOL

ZONE NO.	1	FUNCTION: VEHICLE MAINTENANCE						
OCCUPANCY HOURS:	M-F	600	TO	1700	SAT	0	TO	0
	SUN	0	TO	0				
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F			
	SUMMER OCC	°F		UNOCC	°F			

ZONE NO.	FUNCTION:							
OCCUPANCY HOURS:	M-F		TO		SAT		TO	
	SUN		TO					
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F			
	SUMMER OCC	°F		UNOCC	°F			

ZONE NO.	FUNCTION:							
OCCUPANCY HOURS:	M-F		TO		SAT		TO	
	SUN		TO					
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F			
	SUMMER OCC	°F		UNOCC	°F			

REMARKS:

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 1390

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: CMD

CHECKED BY: CEL

FILE: 1390HV1

AIR HANDLING UNIT SURVEY OBSERVATIONS

HV-1	AHU NO.	ROOFTOP	LOCATION (RM)
BLR-1	REF. SYS. SERVING AHU	WORK BAY	SERVES AREA

UNIT TYPE:

SINGLE ZN	2-PIPE FC	4-PIPE FC	UNIT HTR	X	H&V
MULTIZONE	DOUBLE DT	REHEAT	INDUCTION		VAV
OTHER		OTHER			
COMMENT:					

NAMEPLATE:

TRANE	MFG.	PCC14-A-551A155A35	MODEL
5.0 SUPPLY FAN HP	MARATHON	MFG.	EC184TTDR7627ABWF1
RET/EXH FAN HP		MFG.	
8000 CFM-HTG	0 CFM-CLG	100% MIN %OA	100% MAX %OA
		11%	% HTG AREA SERVED

COMMENT:

COILS:

	NONE	STM	X	HW	ELEC	MOD VLV	PREHEAT
X	NONE	STM		HW	ELEC	MOD VLV	HEATING
X	NONE	STM		HW	ELEC	MOD VLV	REHEAT
X	NONE	STM		HW	ELEC	MOD VLV	HUMID.
X	NONE	STM		HW	ELEC	MOD VLV	COOLING

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENTS
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	NO
REQUIRED START TIME	0	600	600	600	600	600	0	
REQUIRED STOP TIME	0	1700	1700	1700	1700	1700	0	

MONTHS ON:

J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	0	0	0	0	0	1	1	1

CONTROLS:

	PNEUMATIC	X	ELECTRIC	ELEC'NIC	DDC	COMMENTS
THERMOSTAT TYPE:	SINGLE STPT		DUAL SETPNT	SETBACK		
SPACE SETPOINT (oF):	75	OCC HEAT	UNOCC HEAT	OCC COOL	UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK	COLD DECK	MIXED AIR	OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	N	RA (Y/N)
		MA CONTROL		ECONO-DB		ECONO-ENT
DEMAND LIMIT:	N	(Y/N)				

COMMENTS:

FACE & BYPASS

FILE: 1390HV3

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):	75	OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	N	RA (Y/N)		EA (Y/N)	
		MA CONTROL		ECONO - DB		ECONO - ENT	X	OTHER	FACE & BYPASS
DEMAND LIMIT:	N	(Y/N)							
COMMENTS:									

CONTROLS:

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 1390

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 1390RAD

PERIMETER RADIATION SURVEY OBSERVATIONS

RAD-1	PER RAD NO.	OFFICES & TOILETS	LOCATION (RM)
BLR-1	SOURCE OF HEATING	ALL	SERVES AREA

UNIT TYPE:

STEAM	X	HW	ELECTRIC
OTHER			
COMMENT:			

NAMEPLATE:

HW PUMP 1 - HP	MFG.	MODEL
HW PUMP 2 - HP	MFG.	MODEL
HW PUMP 3 - HP	MFG.	MODEL
HW PUMP 4 - HP	MFG.	MODEL
COMMENT:	26.6%	% AREA HEATING

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENT			
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?			
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	NO			
REQUIRED START TIME	0	600	600	600	600	600	0				
REQUIRED STOP TIME	0	1700	1700	1700	1700	1700	0				
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	0	0	0	0	0	1	1	1

CONTROLS:

	PNEUMATIC	ELECTRIC	ELEC'NIC	DDC	COMMENTS
RADIATION CONTROL	X	NONE	2-WAY VLV	3-WAY VLV	OTHER
SPACE SETPOINT (°F):	OCC HEAT	UNOCC HEAT	OCC COOL	UNOCC COOL	
RESET CONTROL (°F):	HW HIGH	HW LOW	OA LOW	OA HIGH	
COMMENTS:					

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
SETPOINTS		PSIG		HW SUPPLY					
RESET CONTROL (oF)	N	HW HIGH	N	HW LOW	N	OA LOW	N	OA HIGH	
BURNER CONTROLS		O2 TRIM (Y/N)		OTHER					
COMMENTS:									

LOCATION: FT. LEONARD WOOD BLDG: 1390

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: **AJN**

CHECKED BY: CEL

FILE: 1390AH1

AIR HANDLING UNIT SURVEY OBSERVATIONS

AC-1	AHU NO.	ABOVE OFFICES	LOCATION (RM)
DX-1	REF. SYS. SERVING AHU	ADMINISTRATION OFFICES	SERVES AREA

UNIT TYPE:

X	SINGLE ZN		2- PIPE FC		4- PIPE FC		UNIT HTR		H&V
	MULTIZONE		DOUBLE DT		REHEAT		INDUCTION		VAV
	NUMBER OF ZONES				OTHER				
	COMMENT:	NO CW PUMP							

NAMEPLATE:

NO NAME PLATE					MFG.					MODEL
0.3	SUPPLY FAN HP		NO NAME PLATE		MFG.					MODEL
	RET/EXH FAN HP				MFG.					MODEL
0	CFM – HTG	750	CFM – CLG	0%	MIN %OA	0%	MAX %OA	0%	% HTG AREA SERVED	

COMMENT:

COILS:

X	NONE		STM		HW		ELEC		MOD VLV	PREHEAT
X	NONE		STM		HW		ELEC		MOD VLV	HEATING
X	NONE		STM		HW		ELEC		MOD VLV	REHEAT
X	NONE		STM		HW		ELEC		MOD VLV	HUMID.
	NONE	X	DX		CW				MOD VLV	COOLING

OPERATION:

HOURS ON:		S	M	T	W	T	F	S	COMMENTS		
PRESENT START TIME		0	0	0	0	0	0	0	TIMECLOCK?		
PRESENT STOP TIME		2400	2400	2400	2400	2400	2400	2400	NO		
REQUIRED START TIME		0	600	600	600	600	600	0			
REQUIRED STOP TIME		0	1700	1700	1700	1700	1700	0			
MONTHS ON:		0									
J	F	M	A	M	J	J	A	S	O	N	D
0	0	0	0	1	1	1	1	1	0	0	0

CONTROLS:

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	N	MAX OA (Y/N)	N	RA (Y/N)	N	EA (Y/N)	
		MA CONTROL		ECONO – DB		ECONO – ENT		OTHER	
DEMAND LIMIT:	N	(Y/N)							

COMMENTS:

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 1390

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 1390CH1

REFRIGERATION EQUIPMENT SURVEY OBSERVATIONS

DX-1	CHILLER/COMPRESSOR NO.	AC-1 ABOVE OFFICES	LOCATION (RM)

UNIT TYPE:

	CENTRIFUGAL WITH WATER SIDE COOLING TOWER		OTHER
	RECIPROCATING WITH WATER SIDE COOLING TOWER	X	AHU'S SERVED AC-1
	RECIPROCATING WITH AIR COOLED CONDENSING UNIT		
	ABSORPTION WITH WATER SIDE COOLING TOWER		
	AIR COOLED CONDENSING UNIT		
CHW	X	DX	OTHER

NAMEPLATE:

CHILLER	MFG.	NO NAME PLATE	MODEL	SERIAL NO.
VOLTS		MCA	PH	HZ
				2.7 CAPACITY (TONS)
CONDENSER FANS	MFG.		MODEL	# OF FANS
VOLTS		AMPS	PH	HZ
				HP
DTW PUMP	MFG.		MODEL	SERIAL NO.
VOLTS		AMPS	PH	HZ
				HP
CNW PUMP	MFG.		MODEL	SERIAL NO.
VOLTS		AMPS	PH	HZ
				HP

COMMENTS:

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENT			
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?			
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400				
REQUIRED START TIME	0	600	600	600	600	600	0				
REQUIRED STOP TIME	0	1700	1700	1700	1700	1700	0				
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
0	0	0	0	1	1	1	1	1	0	0	0

CONTROLS:

	PNEUMATIC	X	ELECTRIC	ELEC'NIC	DDC	COMMENTS
SETPOINTS	CWS (oF)		CWR (oF)	CNWS (oF)	CNWR (oF)	
PANEL INDICATORS						
- PRESSURE	LITE-HI		LITE-LOW	GAUGES		
- TEMPERATURE	LITE-HI		LITE-LOW	GAUGES		
- OTHER						
COMMENTS:						

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 1390

EMC NO.: #3204.000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 1390DHW1

DOMESTIC HW SURVEY OBSERVATIONS

DHW-1	BOILER/CONVERTER NO.	MECH RM	LOCATION (RM)
ELEC.	SOURCE OF HEATING (PLANT)	ALL	SERVES AREA

UNIT TYPE:

NO.2 OIL	NO.6 OIL	N.GAS	X	ELEC	FUELS:
STM/HW	HTHW/HW	HTHW/STM		OTHER	CONVERTER TYPE:

COMMENT:

NAMEPLATE:

A.O. SMITH	MFG.	DVE120 730	MODEL	16000	CAPACITY OUTPUT (WATTS)
	MFG.		MODEL		CAPACITY OUTPUT (BTUH)

DOMESTIC HW CIRCULATION PUMP: NONE

HW PUMP 1 - HP	MFG.	MODEL
HW PUMP 2 - HP	MFG.	MODEL
HW PUMP 3 - HP	MFG.	MODEL

COMMENT:

DIMENSION:	24	DIAMETER (INCHES)	60	HEIGHT OR LENGTH (INCHES)	80	GALLON
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OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENT			
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?			
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	NO			
REQUIRED START TIME	0	600	600	600	600	600	0				
REQUIRED STOP TIME	0	1700	1700	1700	1700	1700	0				
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	1	1	1	1	1	1	1	1

CONTROLS:

	PNEUMATIC	X	ELECTRIC	ELEC'NIC	DDC	COMMENTS
SETPOINTS			HW SUPPLY			
COMMENTS:						

FIELD SURVEY NOTES

BUILDING 1391

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD

BLDG: 1391

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 1391BLG

VI. BUILDING DATA SURVEY OBSERVATIONS

BLDG NO: 1391 BLDG NAME: RESERVE MAINTENANCE

ZONE NO.	1		FUNCTION: MAINTENANCE						
OCCUPANCY HOURS:	M—F	600	TO	1700	SAT	0	TO	0	
	SUN	0	TO	0					
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F				
	SUMMER OCC	°F		UNOCC	°F				

ZONE NO.		FUNCTION:							
OCCUPANCY HOURS:		M-F		TO		SAT		TO	
		SUN		TO					
PRESENT TEMP	WINTER OCC		°F		UNOCC	°F			
	SUMMER OCC		°F		UNOCC	°F			

ZONE NO.		FUNCTION:							
OCCUPANCY HOURS:		M—F		TO		SAT		TO	
		SUN		TO					
PRESENT TEMP	WINTER OCC		°F		UNOCC	°F			
	SUMMER OCC		°F		UNOCC	°F			

REMARKS:

LOCATION: FT. LEONARD WOOD BLDG: 1391

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: **AJN**

CHECKED BY: CEL

FILE: 1391UH1

AIR HANDLING UNIT SURVEY OBSERVATIONS

UH-1	AHU NO.	MAINT. SHOP	LOCATION (RM)
	REF. SYS. SERVING AHU	MAINT. SHOP	SERVES AREA

UNIT TYPE:

	SINGLE ZN		2--PIPE FC		4--PIPE FC	X	UNIT HTR		H&V
	MULTIZONE		DOUBLE DT		REHEAT		INDUCTION		VAV
	NUMBER OF ZONES			OTHER					
	COMMENT:	GAS--FIRED UNIT HEATER (CEILING MOUNTED) FUEL TYPE: PROPANE							

NAMEPLATE:

CARRIER					MFG.	58GS				MODEL
0.3	SUPPLY FAN HP				MFG.					MODEL
	RET/EXH FAN HP				MFG.					MODEL
1150	CFM-HTG	0	CFM-CLG	0%	MIN %OA	0%	MAX %OA	50.0%	% HTG AREA SERVED	
COMMENT:										

COILS:

X	NONE		STM		HW		ELEC		MOD VLV	PREHEAT
X	NONE		FUEL OIL		HW		ELEC		MOD VLV	HEATING
X	NONE		STM		HW		ELEC		MOD VLV	REHEAT
X	NONE		STM		HW		EVAP MEDIA		MOD VLV	HUMID.
X	NONE		DX		CW				MOD VLV	COOLING

OPERATION:

HOURS ON:		S	M	T	W	T	F	S	COMMENTS		
PRESENT START TIME		0	0	0	0	0	0	0	TIMECLOCK?		
PRESENT STOP TIME		2400	2400	2400	2400	2400	2400	2400	NO		
REQUIRED START TIME		0	600	600	600	600	600	0			
REQUIRED STOP TIME		0	1700	1700	1700	1700	1700	0			
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	0	0	0	0	0	1	1	1

CONTROLS:

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (°F):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (°F):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	N	MAX OA (Y/N)	N	RA (Y/N)	N	EA (Y/N)	
		MA CONTROL		ECONO – DB		ECONO – ENT		OTHER	
DEMAND LIMIT:	N	(Y/N)		NO					
COMMENTS:									

FIELD SURVEY NOTES

BUILDING 1601

FIELD SURVEY NOTES

TO: FILE, FT. LEONARD WOOD
FR: CARL LUNDSTROM
DT: 16 NOVEMBER 1992

RE: BLDG 1601, WATER TREATMENT PLANT

Regarding controls:

- From the river they pump water to the treatment plant.
- They have 4 electric and 1 diesel pump.
- Normally they run 2 pumps in the summer, and 1 pump in the winter
- They have two headers from the pump station to the plant
- They have flow meters on both headers
- They could use a totalizer and flow on each header into the plant
- They could use a flow and totalizer on headers out of plant
- They could use a turbidity measurement into plant
- They could use a turbidity and chlorine out of plant
- Chemical metering is OK now
- Elevated tank level is OK now
- DNR does not require pH metering

Regarding pumping:

- They really need a variable speed pumping system which could be monitored and controlled from the plant.
- The combinations of pumps at the river and wells doesn't give them much flexibility.
- When pumps go off from a momentary power trip, the pumps go off, and must be manually restarted.
- Until an extra man comes on first shift, the pumps can not be restarted.

FIELD SURVEY NOTES

BUILDING 1700

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD

BLDG: 1700

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 1700BLG

VI. BUILDING DATA SURVEY OBSERVATIONS

BLDG NO: 1700 BLDG NAME: STORAGE

ZONE NO.	1		FUNCTION: STORAGE						
OCCUPANCY HOURS:	M—F	700	TO	1600	SAT	0	TO	0	
	SUN	0	TO	0					
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F				
	SUMMER OCC	°F		UNOCC	°F				

ZONE NO.		FUNCTION:							
OCCUPANCY HOURS:		M—F		TO		SAT		TO	
		SUN		TO					
PRESENT TEMP	WINTER OCC		°F		UNOCC	°F			
	SUMMER OCC		°F		UNOCC	°F			

ZONE NO.		FUNCTION:							
OCCUPANCY HOURS:		M—F		TO		SAT		TO	
		SUN		TO					
PRESENT TEMP	WINTER OCC		°F		UNOCC	°F			
	SUMMER OCC		°F		UNOCC	°F			

REMARKS:

COMMENTS:

FILE: 1700UH2

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (°F):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (°F):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:		MIN OA (Y/N)		MAX OA (Y/N)		RA (Y/N)		EA (Y/N)	
		MA CONTROL		ECONO – DB		ECONO – ENT		OTHER	
DEMAND LIMIT:		YES	N	NO					
COMMENTS:									

FILE: 1700UH4

SERVES AREA

ELECTRIC

COMMENT:

COOLING

COMMENTS:

CONTROLS:

FILE: 1700UH6

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (°F):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (°F):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:		MIN OA (Y/N)		MAX OA (Y/N)		RA (Y/N)		EA (Y/N)	
		MA CONTROL		ECONO – DB		ECONO – ENT		OTHER	
DEMAND LIMIT:		YES	N	NO					
COMMENTS:									

FIELD SURVEY NOTES

BUILDING 1702
AND TYPICAL FOR
1701, 1706, AND 1707

FILE: 1702FC

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:	68	SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	N	MAX OA (Y/N)		RA (Y/N)		EA (Y/N)	
		MA CONTROL		ECONO - DB		ECONO - ENT		OTHER	
DEMAND LIMIT:	Y	YES		NO					
COMMENTS:									

FILE: 1702HV1

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:	X	SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):	68.9	OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):	NA	HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	N	MAX OA (Y/N)	N	RA (Y/N)	N	EA (Y/N)	
	NA	MA CONTROL		ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:	Y	YES		NO					
COMMENTS:									

FILE: 1702HV2

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:	X	SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):	68.9	OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):	NA	HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	N	MAX OA (Y/N)	N	RA (Y/N)	N	EA (Y/N)	
	NA	MA CONTROL		ECONO – DB		ECONO – ENT		OTHER	
DEMAND LIMIT:	Y	YES		NO					
COMMENTS:									

FILE: 1702HV3

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:	X	SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):	68.9	OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):	NA	HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	N	MAX OA (Y/N)	N	RA (Y/N)	N	EA (Y/N)	
	NA	MA CONTROL		ECONO - DB		ECONO - ENT		OTHER	
DEMAND LIMIT:	Y	YES		NO					
COMMENTS:									

CONTROLS:

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 1702

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: cmd

CHECKED BY: CEL

FILE: 1702HV5

AIR HANDLING UNIT SURVEY OBSERVATIONS

HV-5	AHU NO.	STORAGE	LOCATION (RM)
NA	REF. SYS. SERVING AHU	BAY 5	SERVES AREA

UNIT TYPE:

SINGLE ZN	2-PIPE FC	4-PIPE FC	UNIT HTR	X	H&V
MULTIZONE	DOUBLE DT	REHEAT	INDUCTION		VAV
NUMBER OF ZONES		OTHER			
COMMENT:					

NAMEPLATE:

TRANE				MFG.		SER. K5L299560 TYPE L-6				MODEL									
1.3		SUPPLY FAN HP		MARATHON		MFG.		DN182TTDR72808AWCCW				MODEL							
		RET/EXH FAN HP				MFG.						MODEL							
2400		CFM-HTG		0		CFM-CLG		10%		MIN %OA		100%		MAX %OA		20%		% HTG AREA SERVED	
COMMENT:																			

COILS:

X	NONE	STM		HW		ELEC		MOD VLV	PREHEAT
	NONE	STM	X	HW		ELEC	X	MOD VLV	HEATING
X	NONE	STM		HW		ELEC		MOD VLV	REHEAT
X	NONE	STM		HW		ELEC		MOD VLV	HUMID.
X	NONE	DX		CW				MOD VLV	COOLING

OPERATION:

HOURS ON:		S	M	T	W	T	F	S	COMMENTS		
PRESENT START TIME		0	0	0	0	0	0	0	TIMECLOCK?		
PRESENT STOP TIME		2400	2400	2400	2400	2400	2400	2400	NO		
REQUIRED START TIME		0	500	500	500	500	500	500			
REQUIRED STOP TIME		0	1700	1700	1700	1700	1700	1700			
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	0	0	0	0	0	0	1	1	1

CONTROLS:

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:	X	SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):	68.9	OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):	NA	HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	N	MAX OA (Y/N)	N	RA (Y/N)	N	EA (Y/N)	
	NA	MA CONTROL		ECONO – DB		ECONO – ENT		OTHER	
DEMAND LIMIT:	Y	YES		NO					
COMMENTS:									

LOCATION: FT. LEONARD WOOD BLDG: 1702

FILE: 1702CV

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
SETPOINTS		PSIG	155	HW SUPPLY					
RESET CONTROL (oF)	X	HW HIGH		HW LOW		OA LOW		OA HIGH	
BURNER CONTROLS		O2 TRIM (Y/N)		OTHER					
COMMENTS: RESET TEMP NOT AVAILABLE									

COMMENTS:

FIELD SURVEY NOTES
BUILDING 1703 AND 1704

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD

BLDG: 1703

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 1703BLG

VI. BUILDING DATA SURVEY OBSERVATIONS

BLDG NO: 1703 BLDG NAME: BATTALION HQ

ZONE NO.	1		FUNCTION: ADMINISTRATION/CLASSROOMS						
OCCUPANCY HOURS:	M—F	800	TO	1700	SAT	800	TO	1700	
	SUN	800	TO	1700					
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F				
	SUMMER OCC	°F		UNOCC	°F				

ZONE NO.		FUNCTION:							
OCCUPANCY HOURS:		M-F		TO		SAT		TO	
		SUN		TO					
PRESENT TEMP	WINTER OCC		°F		UNOCC	°F			
	SUMMER OCC		°F		UNOCC	°F			

ZONE NO.		FUNCTION:							
OCCUPANCY HOURS:		M—F		TO		SAT		TO	
		SUN		TO					
PRESENT TEMP	WINTER OCC		°F		UNOCC	°F			
	SUMMER OCC		°F		UNOCC	°F			

REMARKS:

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 1703

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 1703AH1

AIR HANDLING UNIT SURVEY OBSERVATIONS

AHU-1	AHU NO.	MECH. ROOM	LOCATION (RM)
C. PLANT	REF. SYS. SERVING AHU	OFFICES & CLASSROOMS	SERVES AREA

UNIT TYPE:

	SINGLE ZN		2-PIPE FC		4-PIPE FC		UNIT HTR		H&V
X	MULTIZONE		DOUBLE DT		REHEAT		INDUCTION		VAV
7	NUMBER OF ZONES				OTHER				
	COMMENT:								

NAMEPLATE:

TRANE					MFG.	LZ-25				MODEL
7.5	SUPPLY FAN HP		LINCOLN		MFG.	627003				MODEL
	RET/EXH FAN HP				MFG.					MODEL
13275	CFM-HTG	13275	CFM-CLG	10%	MIN %OA	100%	MAX %OA	66%	% HTG AREA SERVED	
COMMENT:										

COILS:

X	NONE		STM		HW		ELEC		MOD VLV	PREHEAT
	NONE		STM	X	HW		ELEC	X	MOD VLV	HEATING
X	NONE		STM		HW		ELEC		MOD VLV	REHEAT
X	NONE		STM		HW		ELEC		MOD VLV	HUMID.
	NONE		DX	X	CW				MOD VLV	COOLING

OPERATION:

HOURS ON:		S	M	T	W	T	F	S	COMMENTS		
PRESENT START TIME		0	0	0	0	0	0	0	TIMECLOCK?		
PRESENT STOP TIME		2400	2400	2400	2400	2400	2400	2400	NO		
REQUIRED START TIME		800	800	800	800	800	800	800			
REQUIRED STOP TIME		1700	1700	1700	1700	1700	1700	1700			
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	1	1	1	1	1	1	1	1

CONTROLS:

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	RESET FROM SPACE
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)	Y	EA (Y/N)	THERMOSTATS
	Y	MA CONTROL		ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:	Y	YES		NO					

COMMENTS: CONTROLS ARE IN GOOD CONDITION

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 1703

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 1703FC1

AIR HANDLING UNIT SURVEY OBSERVATIONS

FC-1	AHU NO.	STORAGE AREAS	LOCATION (RM)
C. PLANT	REF. SYS. SERVING AHU	ALL	SERVES AREA

UNIT TYPE:

SINGLE ZN	2-PIPE FC	X	4-PIPE FC	UNIT HTR	H&V
MULTIZONE	DOUBLE DT		REHEAT	INDUCTION	VAV
NUMBER OF ZONES			OTHER		
COMMENT:					

NAMEPLATE:

					MFG.						MODEL
2.0	SUPPLY FAN HP				MFG.						MODEL
0.0	RET/EXH FAN HP				MFG.						MODEL
6280	CFM-HTG	6280	CFM-CLG	0%	MIN %OA	0%	MAX %OA	34.0%	% HTG AREA SERVED		
COMMENT: TOTAL CFM FOR 8 FAN COILS											

COILS:

X	NONE		STM		HW		ELEC		MOD VLV	PREHEAT
	NONE		STM	X	HW		ELEC		MOD VLV	HEATING
X	NONE		STM		HW		ELEC		MOD VLV	REHEAT
X	NONE		STM		HW		EVAP MEDIA		MOD VLV	HUMID.
	NONE		DX	X	CW				MOD VLV	COOLING

OPERATION:

HOURS ON:		S	M	T	W	T	F	S	COMMENTS		
PRESENT START TIME		0	0	0	0	0	0	0	TIMECLOCK?		
PRESENT STOP TIME		2400	2400	2400	2400	2400	2400	2400	NO		
REQUIRED START TIME		800	800	800	800	800	800	800			
REQUIRED STOP TIME		1700	1700	1700	1700	1700	1700	1700			
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	1	1	1	1	1	1	1	1

CONTROLS:

	PNEUMATIC	X	ELECTRIC	ELEC'NIC	DDC	COMMENTS
THERMOSTAT TYPE:	SINGLE STPT		DUAL SETPNT	SETBACK		
SPACE SETPOINT (°F):	OCC HEAT		UNOCC HEAT	OCC COOL	UNOCC COOL	
OTHER SETPOINTS (°F):	HOT DECK		COLD DECK	MIXED AIR	OTHER	
DAMPER CONTROL:	MIN OA (Y/N)		MAX OA (Y/N)	RA (Y/N)	EA (Y/N)	
	MA CONTROL		ECONO-DB	ECONO-ENT	OTHER	
DEMAND LIMIT:	YES	X	NO			
COMMENTS:						

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
SETPOINTS		CWS (oF)		CWR (oF)		CNWS (oF)		CNWR (oF)	
PANEL INDICATORS									
- PRESSURE		LITE-HI		LITE-LOW		GAUGES			
- TEMPERATURE		LITE-HI		LITE-LOW		GAUGES			
- OTHER									
COMMENTS:									

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 1703

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 1703PMP2

REFRIGERATION EQUIPMENT SURVEY OBSERVATIONS

CHW PUMP	CHILLER/COMPRESSOR NO.	MECH. ROOM	LOCATION (RM)

UNIT TYPE:

	CENTRIFUGAL WITH WATER SIDE COOLING TOWER		OTHER
	RECIPROCATING WITH WATER SIDE COOLING TOWER	X	AHU'S SERVED FAN COILS
	RECIPROCATING WITH AIR COOLED CONDENSING UNIT		
	ABSORPTION WITH WATER SIDE COOLING TOWER		
	AIR COOLED CONDENSING UNIT		
CHW		DX	X OTHER
			CHW PUMP ONLY

NAMEPLATE:

CHILLER	MFG.		MODEL		SERIAL NO.
VOLTS		AMPS	PH	HZ	CAPACITY (TONS)
CONDENSER FANS	MFG.		MODEL		# OF FANS
VOLTS		AMPS	PH	HZ	HP
CW PUM DAYTON	MFG.	6K22BB	MODEL		SERIAL NO.
VOLTS		AMPS	PH	HZ	0.33 HP
CNW PUMP	MFG.		MODEL		SERIAL NO.
VOLTS		AMPS	PH	HZ	HP

COMMENTS:

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENT
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	NO TIMECLOCK
REQUIRED START TIME	800	800	800	800	800	800	800	
REQUIRED STOP TIME	1700	1700	1700	1700	1700	1700	1700	

MONTHS ON:

J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	1	1	1	1	1	1	1	1

CONTROLS:

	PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
SETPOINTS	CWS (oF)		CWR (oF)		CNWS (oF)		CNWR (oF)	
PANEL INDICATORS								
- PRESSURE	LITE-HI		LITE-LOW		GAUGES			
- TEMPERATURE	LITE-HI		LITE-LOW		GAUGES			
- OTHER								

COMMENTS:

	X	PNEUMATIC	ELECTRIC	ELEC'NIC	DDC	COMMENTS
SETPOINTS		PSIG	HW SUPPLY			
RESET CONTROL (oF)		HW HIGH	HW LOW	OA LOW	OA HIGH	
BURNER CONTROLS		O2 TRIM (Y/N)	OTHER			
COMMENTS:						

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 1703

EMC NO.: #3204.000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 1703DHW1

DOMESTIC HW SURVEY OBSERVATIONS

DHW-1	BOILER/CONVERTER NO.	MECH RM	LOCATION (RM)
ELEC.	SOURCE OF HEATING (PLANT)	ALL	SERVES AREA

UNIT TYPE:

NO.2 OIL	NO.6 OIL	N.GAS	X	ELEC	FUELS:
STM/HW	HTHW/HW	HTHW/STM		OTHER	CONVERTER TYPE:

COMMENT:

NAMEPLATE:

RUUD	MFG.	RP40-1	MODEL	6000	CAPACITY OUTPUT (WATTS)
	MFG.		MODEL		CAPACITY OUTPUT (BTUH)
DOMESTIC HW CIRCULATION PUMP: YES					
0.063	HW PUMP 1 - HP	TACO	MFG.		MODEL
	HW PUMP 2 - HP		MFG.		MODEL
	HW PUMP 3 - HP		MFG.		MODEL

COMMENT:

DIMENSION: 24 DIAMETER (INCHES) 58 HEIGHT OR LENGTH (INCHES) 40 GALLON

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENT
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	NO
REQUIRED START TIME	800	800	800	800	800	800	800	
REQUIRED STOP TIME	1700	1700	1700	1700	1700	1700	1700	

MONTHS ON:

J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	1	1	1	1	1	1	1	1

CONTROLS:

	PNEUMATIC	X	ELECTRIC	ELEC'NIC	DDC	COMMENTS
SETPOINTS			HW SUPPLY			

COMMENTS:

FIELD SURVEY NOTES

BUILDING 1705

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD

BLDG: 1705

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 1705BLG

VI. BUILDING DATA SURVEY OBSERVATIONS

BLDG NO: 1705 BLDG NAME: ADMINISTRATION/COURTROOM

ZONE NO.	1		FUNCTION: ADMINISTRATION/COURTROOM						
OCCUPANCY HOURS:	M-F	700	TO	1700	SAT	700	TO	1700	
	SUN	700	TO	1700					
PRESENT TEMP	WINTER OCC		°F		UNOCC	°F			
	SUMMER OCC		°F		UNOCC	°F			

ZONE NO.		FUNCTION:							
OCCUPANCY HOURS:		M—F		TO		SAT		TO	
		SUN		TO					
PRESENT TEMP	WINTER OCC		°F		UNOCC	°F			
	SUMMER OCC		°F		UNOCC	°F			

ZONE NO.		FUNCTION:							
OCCUPANCY HOURS:		M—F		TO		SAT		TO	
		SUN		TO					
PRESENT TEMP	WINTER OCC		°F		UNOCC	°F			
	SUMMER OCC		°F		UNOCC	°F			

REMARKS:

FILE: 1705AH1

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:	X	SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)	N	EA (Y/N)	
		MA CONTROL		ECONO - DB		ECONO - ENT		OTHER	
DEMAND LIMIT:	Y	YES		NO					
COMMENTS:									

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 1705

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 1705CH1

REFRIGERATION EQUIPMENT SURVEY OBSERVATIONS

CH-1	CHILLER/COMPRESSOR NO.	OUTSIDE BLDG	LOCATION (RM)

UNIT TYPE:

	CENTRIFUGAL WITH WATER SIDE COOLING TOWER		OTHER
	RECIPROCATING WITH WATER SIDE COOLING TOWER	X	AHU'S SERVED AHU-1
X	RECIPROCATING WITH AIR COOLED CONDENSING UNIT		
	ABSORPTION WITH WATER SIDE COOLING TOWER		
	AIR COOLED CONDENSING UNIT		
X	CHW	DX	OTHER

NAMEPLATE:

CHILLER	TSI	MFG.	GA2CSB	MODEL	SERIAL NO.
208	VOLTS	102	AMPS	3 PH	60 HZ
					30 CAPACITY (TONS)
CONDENSER FANS	MFG.	MODEL			2 # OF FANS
208	VOLTS	4.8	AMPS	3 PH	60 HZ
					1 HP
CW PUM	B & G	MFG.	M98550	MODEL	SERIAL NO.
200	VOLTS	4.95	AMPS	3 PH	60 HZ
					1 HP
CNW PUMP	MFG.	MODEL			SERIAL NO.
	VOLTS		AMPS	PH	HZ
					HP

COMMENTS: TOTAL MCA IS 125, 1 COMPRESSER

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENT			
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?			
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	NO TIMECLOCK			
REQUIRED START TIME	700	700	700	700	700	700	700				
REQUIRED STOP TIME	1700	1700	1700	1700	1700	1700	1700				
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
0	0	0	0	1	1	1	1	1	0	0	0

CONTROLS:

	PNEUMATIC	X	ELECTRIC	ELEC'NIC	DDC	COMMENTS
SETPOINTS	CWS (oF)		CWR (oF)	CNWS (oF)	CNWR (oF)	
PANEL INDICATORS						
- PRESSURE	LITE-HI		LITE-LOW	GAUGES		
- TEMPERATURE	LITE-HI		LITE-LOW	GAUGES		
- OTHER						
COMMENTS:	HAS A FLOW SWITCH					

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
SETPOINTS		PSIG	200	HW SUPPLY					HAS O.A. RESET
RESET CONTROL (oF)		HW HIGH		HW LOW		OA LOW		OA HIGH	CONTROL
BURNER CONTROLS		O2 TRIM (Y/N)		OTHER					
COMMENTS: CONTROLS ARE IN GOOD CONDITION									
NEW CONTROL AIR COMPRESSER									
HAS TWO-WAY VALVE ON CW RETURN									

FIELD SURVEY NOTES

BUILDING 1711

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD

BLDG: 1711

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 1711BLG

VI. BUILDING DATA SURVEY OBSERVATIONS

BLDG NO: 1711 BLDG NAME: PX

ZONE NO.	1	FUNCTION: STORE/SNACK BAR						
OCCUPANCY HOURS:	M-F	1100	TO	1400	SAT	0	TO	0
	SUN	0	TO	0				
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F			
	SUMMER OCC	°F		UNOCC	°F			

ZONE NO.	FUNCTION:							
OCCUPANCY HOURS:	M-F		TO		SAT		TO	
	SUN		TO					
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F			
	SUMMER OCC	°F		UNOCC	°F			

ZONE NO.	FUNCTION:							
OCCUPANCY HOURS:	M-F		TO		SAT		TO	
	SUN		TO					
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F			
	SUMMER OCC	°F		UNOCC	°F			

REMARKS:

FILE: 1711AH1

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)	N	EA (Y/N)	
		MA CONTROL		ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:	Y	YES		NO					
COMMENTS:									

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
SETPOINTS		PSIG		HW SUPPLY					
RESET CONTROL (oF)		HW HIGH		HW LOW		OA LOW		OA HIGH	
BURNER CONTROLS		O2 TRIM (Y/N)		OTHER					
COMMENTS:									

FILE: 1711PMP

LOCATION (RM)

CHW PUMP ONLY

* BELL & GOSSETT

1

- OTHER

COMMENTS:

FIELD SURVEY NOTES

BUILDING 1712

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD

BLDG: 1712

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 1712BLG

VI. BUILDING DATA SURVEY OBSERVATIONS

BLDG NO: 1712 BLDG NAME: CHAPEL

ZONE NO.	1	FUNCTION: CHURCH						
OCCUPANCY HOURS:	M – F	1700	TO	1800	SAT	1700	TO	1800
	SUN	800	TO	1200				
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F			
	SUMMER OCC	°F		UNOCC	°F			

ZONE NO.		2		FUNCTION: ADMINISTRATION OFFICES													
OCCUPANCY HOURS:		M-F		800		TO		1600		SAT		1700		TO		1800	
		SUN		800		TO		1200									
PRESENT TEMP		WINTER OCC			°F			UNOCC			°F						
		SUMMER OCC			°F			UNOCC			°F						

ZONE NO.		FUNCTION:							
OCCUPANCY HOURS:		M – F		TO		SAT		TO	
		SUN		TO					
PRESENT TEMP	WINTER OCC		°F		UNOCC	°F			
	SUMMER OCC		°F		UNOCC	°F			

REMARKS:

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:	X	SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):	68	OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)	N	EA (Y/N)	
		MA CONTROL		ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:	Y	YES		NO					
COMMENTS:									

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:	X	SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):	68	OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)	N	EA (Y/N)	
		MA CONTROL		ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:	Y	YES		NO					
COMMENTS:									

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 1712

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 1712PMP

REFRIGERATION EQUIPMENT SURVEY OBSERVATIONS

CHW PUMP	CHILLER/COMPRESSOR NO.	MECH. ROOM	LOCATION (RM)

UNIT TYPE:

CENTRIFUGAL WITH WATER SIDE COOLING TOWER		OTHER
RECIPROCATING WITH WATER SIDE COOLING TOWER	X	AHU'S SERVED AHU-1, AHU-2, &
RECIPROCATING WITH AIR COOLED CONDENSING UNIT		AHU-3; ZONE 1
ABSORPTION WITH WATER SIDE COOLING TOWER		
AIR COOLED CONDENSING UNIT		
CHW	DX	X OTHER CHW PUMP ONLY

NAMEPLATE:

CHILLER	MFG.		MODEL		SERIAL NO.
VOLTS		AMPS	PH	HZ	CAPACITY (TONS)
CONDENSER FANS	MFG.		MODEL		# OF FANS
VOLTS		AMPS	PH	HZ	HP
DTW PUMP	MFG.	NO NAME PLATE	MODEL		SERIAL NO.
230 VOLTS	5	AMPS	3 PH	60 HZ	2 HP
CNW PUMP	MFG.		MODEL		SERIAL NO.
VOLTS		AMPS	PH	HZ	HP

COMMENTS:

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENT			
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?			
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	NO TIMECLOCK			
REQUIRED START TIME	800	800	800	800	800	800	1700				
REQUIRED STOP TIME	1200	1600	1600	1600	1600	1600	1800				
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	1	1	1	1	1	1	1	1

CONTROLS:

	PNEUMATIC	X	ELECTRIC	ELEC'NIC	DDC	COMMENTS
SETPOINTS	CWS (oF)		CWR (oF)	CNWS (oF)	CNWR (oF)	
PANEL INDICATORS						
- PRESSURE	LITE-HI		LITE-LOW	GAUGES		
- TEMPERATURE	LITE-HI		LITE-LOW	GAUGES		
- OTHER						

COMMENTS:

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
SETPOINTS		PSIG		HW SUPPLY					
RESET CONTROL (oF)		HW HIGH		HW LOW		OA LOW		OA HIGH	
BURNER CONTROLS		O2 TRIM (Y/N)		OTHER					
COMMENTS:									

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 1712

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: BHS

CHECKED BY: CEL

FILE: 1712FC1

AIR HANDLING UNIT SURVEY OBSERVATIONS

FC-1	AHU NO.	OFFICE AREA (ZN)	LOCATION (RM)
C. PLANT	REF. SYS. SERVING AHU	ALL	SERVES AREA

UNIT TYPE:

SINGLE ZN	X	2-PIPE FC	4-PIPE FC	UNIT HTR	H&V
MULTIZONE		DOUBLE DT	REHEAT	INDUCTION	VAV
NUMBER OF ZONES		OTHER			
COMMENT:	FAN COIL PER ROOM				

NAMEPLATE:

					MFG.						MODEL
0.4	SUPPLY FAN HP				MFG.						MODEL
0.0	RET/EXH FAN HP				MFG.						MODEL
2800	CFM-HTG	2800	CFM-CLG	10%	MIN %OA	10%	MAX %OA	100.0%	% HTG AREA SERVED		
COMMENT: TOTAL CFM FOR ALL FAN COILS											

COILS:

X	NONE		STM		HW		ELEC		MOD VLV	PREHEAT
	NONE		STM	X	HW		ELEC		MOD VLV	HEATING
X	NONE		STM		HW		ELEC		MOD VLV	REHEAT
X	NONE		STM		HW		EVAP MEDIA		MOD VLV	HUMID.
	NONE		DX	X	CW				MOD VLV	COOLING

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENTS			
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?			
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	NO			
REQUIRED START TIME	800	800	800	800	800	800	1700				
REQUIRED STOP TIME	1200	1600	1600	1600	1600	1600	1800				
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	1	1	1	1	1	1	1	1

CONTROLS:

	PNEUMATIC	X	ELECTRIC	ELEC'NIC	DDC	COMMENTS
THERMOSTAT TYPE:	X	SINGLE STPT	DUAL SETPNT	SETBACK		
SPACE SETPOINT (°F):		OCC HEAT	UNOCC HEAT	OCC COOL	UNOCC COOL	
OTHER SETPOINTS (°F):		HOT DECK	COLD DECK	MIXED AIR	OTHER	
DAMPER CONTROL:		MIN OA (Y/N)	MAX OA (Y/N)	RA (Y/N)	EA (Y/N)	
		MA CONTROL	ECONO-DB	ECONO-ENT	OTHER	
DEMAND LIMIT:		YES	X	NO		
COMMENTS:						

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
SETPOINTS				HW SUPPLY					
COMMENTS:									

FIELD SURVEY NOTES

BUILDING 1714

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD

BLDG: 1714

EMC NO.: #3204-000

DATE: Apr-93

PREPARED BY: CMD

CHECKED BY: CEL

FILE: 1714BLG

VI. BUILDING DATA SURVEY OBSERVATIONS

BLDG NO: 1714 BLDG NAME: GYM

ZONE NO.	1	FUNCTION: GYM					
OCCUPANCY HOURS:	M-F	530	TO	2100	SAT	900	TO 1800
	SUN	1200	TO	2000			
PRESENT TEMP	WINTER OCC	73.0 °F		UNOCC	°F		
	SUMMER OCC	°F		UNOCC	°F		

ZONE NO.		FUNCTION:					
OCCUPANCY HOURS:	M-F		TO		SAT		TO
	SUN		TO				
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F		
	SUMMER OCC	°F		UNOCC	°F		

ZONE NO.		FUNCTION:					
OCCUPANCY HOURS:	M-F		TO		SAT		TO
	SUN		TO				
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F		
	SUMMER OCC	°F		UNOCC	°F		

REMARKS:

COMMENTS:

FILE: 1714AH2

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)	N	EA (Y/N)	
		MA CONTROL		ECONO –DB		ECONO –ENT		OTHER	
DEMAND LIMIT:	Y	YES	N	NO					
COMMENTS: RA AND OA SHARE DAMPER ACTUATOR, HAS FACE & BYPASS DAMPERS									

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 1714

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 1714HV1

AIR HANDLING UNIT SURVEY OBSERVATIONS

HV-1	AHU NO.	GYMNASIUM	LOCATION (RM)
CV-1	REF. SYS. SERVING AHU	GYMNASIUM	SERVES AREA

UNIT TYPE:

SINGLE ZN	2-PIPE FC	4-PIPE FC	UNIT HTR	X	H&V
MULTIZONE	DOUBLE DT	REHEAT	INDUCTION		VAV
OTHER		OTHER			
COMMENT:					

NAMEPLATE:

TRANE					MFG.						MODEL
5.0	SUPPLY FAN HP		MARATHON		MFG.	DL184TTDR7627ABWF1					MODEL
	RET/EXH FAN HP				MFG.						MODEL
11300	CFM-HTG	0	CFM-CLG	0%	MIN %OA	100%	MAX %OA	12.5%	% HTG AREA SERVED		
COMMENT:											

COILS:

X	NONE	STM	HW	ELEC	MOD VLV	PREHEAT
	NONE	X STM	HW	ELEC	MOD VLV	HEATING
X	NONE	STM	HW	ELEC	MOD VLV	REHEAT
X	NONE	STM	HW	ELEC	MOD VLV	HUMID.
X	NONE	STM	HW	ELEC	MOD VLV	COOLING

OPERATION:

OPERATION:											
HOURS ON:		S	M	T	W	T	F	S	COMMENTS		
PRESENT START TIME		0	0	0	0	0	0	0	TIMECLOCK?		
PRESENT STOP TIME		2400	2400	2400	2400	2400	2400	2400	NO		
REQUIRED START TIME		1200	600	600	600	600	600	900			
REQUIRED STOP TIME		2000	2100	2100	2100	2100	2100	1800			
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	0	0	0	0	0	1	1	1

CONTROLS:

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)	N	EA (Y/N)	
		MA CONTROL		ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:		YES		NO					
COMMENTS: RETURN AIR USES SPACE AS PLENUM, HAS FACE & BYPASS DAMPERS									

RETURN AIR USES SPACE AS PLENUM, HAS FACE & BYPASS DAMPERS

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 1714

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 1714HV2

AIR HANDLING UNIT SURVEY OBSERVATIONS

HV-2	AHU NO.	GYMNASIUM	LOCATION (RM)
CV-1	REF. SYS. SERVING AHU	GYMNASIUM	SERVES AREA

UNIT TYPE:

SINGLE ZN	2-PIPE FC	4-PIPE FC	UNIT HTR	X	H&V
MULTIZONE	DOUBLE DT	REHEAT	INDUCTION		VAV
OTHER		OTHER			
COMMENT:					

NAMEPLATE:

TRANE					MFG.						MODEL
5.0	SUPPLY FAN HP		MARATHON		MFG.	DL184TTDR7627ABWF1					MODEL
	RET/EXH FAN HP				MFG.						MODEL
11300	CFM-HTG	0	CFM-CLG	0%	MIN %OA	100%	MAX %OA	12.5%	% HTG AREA SERVED		
COMMENT:											

COILS:

X	NONE	STM	HW	ELEC	MOD VLV	PREHEAT
	NONE	X STM	HW	ELEC	MOD VLV	HEATING
X	NONE	STM	HW	ELEC	MOD VLV	REHEAT
X	NONE	STM	HW	ELEC	MOD VLV	HUMID.
X	NONE	STM	HW	ELEC	MOD VLV	COOLING

OPERATION:

HOURS ON:		S	M	T	W	T	F	S	COMMENTS		
PRESENT START TIME		0	0	0	0	0	0	0	TIMECLOCK?		
PRESENT STOP TIME		2400	2400	2400	2400	2400	2400	2400	NO		
REQUIRED START TIME		1200	600	600	600	600	600	900			
REQUIRED STOP TIME		2000	2100	2100	2100	2100	2100	1800			
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	0	0	0	0	0	1	1	1

CONTROLS:

	X	PNEUMATIC	ELECTRIC	ELEC'NIC	DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT	DUAL SETPNT	SETBACK		
SPACE SETPOINT (oF):		OCC HEAT	UNOCC HEAT	OCC COOL	UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK	COLD DECK	MIXED AIR	OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y MAX OA (Y/N)	Y RA (Y/N)	N EA (Y/N)	
		MA CONTROL	ECONO-DB	ECONO-ENT	OTHER	
DEMAND LIMIT:		YES	NO			
COMMENTS:						RETURN AIR USES SPACE AS PLENUM, HAS FACE & BYPASS DAMPERS

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 1714

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 1714HV3

AIR HANDLING UNIT SURVEY OBSERVATIONS

HV-3	AHU NO.	GYMNASIUM	LOCATION (RM)
CV-1	REF. SYS. SERVING AHU	GYMNASIUM	SERVES AREA

UNIT TYPE:

SINGLE ZN	2-PIPE FC	4-PIPE FC	UNIT HTR	X	H&V
MULTIZONE	DOUBLE DT	REHEAT	INDUCTION		VAV
OTHER		OTHER			
COMMENT:					

NAMEPLATE:

TRANE				MFG.						MODEL			
5.0		SUPPLY FAN HP		MARATHON		MFG.		DL184TTDR7627ABWF1				MODEL	
		RET/EXH FAN HP				MFG.						MODEL	
11300		CFM-HTG	0	CFM-CLG	0%	MIN %OA		100%	MAX %OA		12.5%	% HTG AREA SERVED	
COMMENT:													

COILS:

X	NONE	STM	HW	ELEC	MOD VLV	PREHEAT
	NONE	X STM	HW	ELEC	MOD VLV	HEATING
X	NONE	STM	HW	ELEC	MOD VLV	REHEAT
X	NONE	STM	HW	ELEC	MOD VLV	HUMID.
X	NONE	STM	HW	ELEC	MOD VLV	COOLING

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENTS			
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?			
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	NO			
REQUIRED START TIME	1200	600	600	600	600	600	900				
REQUIRED STOP TIME	2000	2100	2100	2100	2100	2100	1800				
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	0	0	0	0	0	1	1	1

CONTROLS:

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)	N	EA (Y/N)	
		MA CONTROL		ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:		YES		NO					

COMMENTS: RETURN AIR USES SPACE AS PLENUM, HAS FACE & BYPASS DAMPERS

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 1714

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 1714HV4

AIR HANDLING UNIT SURVEY OBSERVATIONS

HV-4	AHU NO.	GYMNASIUM	LOCATION (RM)
CV-1	REF. SYS. SERVING AHU	GYMNASIUM	SERVES AREA

UNIT TYPE:

SINGLE ZN	2-PIPE FC	4-PIPE FC	UNIT HTR	X	H&V
MULTIZONE	DOUBLE DT	REHEAT	INDUCTION		VAV
OTHER		OTHER			
COMMENT:					

NAMEPLATE:

TRANE					MFG.						MODEL
5.0	SUPPLY FAN HP		MARATHON		MFG.	DL184TTDR7627ABWF1					MODEL
	RET/EXH FAN HP				MFG.						MODEL
11300	CFM-HTG	0	CFM-CLG	0%	MIN %OA	100%	MAX %OA	12.5%	% HTG AREA SERVED		
COMMENT:											

COILS:

X	NONE	STM	HW	ELEC	MOD VLV	PREHEAT
	NONE	X STM	HW	ELEC	MOD VLV	HEATING
X	NONE	STM	HW	ELEC	MOD VLV	REHEAT
X	NONE	STM	HW	ELEC	MOD VLV	HUMID.
X	NONE	STM	HW	ELEC	MOD VLV	COOLING

OPERATION:

HOURS ON:		S	M	T	W	T	F	S	COMMENTS		
PRESENT START TIME		0	0	0	0	0	0	0	TIMECLOCK?		
PRESENT STOP TIME		2400	2400	2400	2400	2400	2400	2400	NO		
REQUIRED START TIME		1200	600	600	600	600	600	900			
REQUIRED STOP TIME		2000	2100	2100	2100	2100	2100	1800			
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	0	0	0	0	0	1	1	1

CONTROLS:

	X	PNEUMATIC	ELECTRIC	ELEC'NIC	DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT	DUAL SETPNT	SETBACK		
SPACE SETPOINT (oF):		OCC HEAT	UNOCC HEAT	OCC COOL	UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK	COLD DECK	MIXED AIR	OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y MAX OA (Y/N)	Y RA (Y/N)	N EA (Y/N)	
		MA CONTROL	ECONO-DB	ECONO-ENT	OTHER	
DEMAND LIMIT:		YES	NO			
COMMENTS:	RETURN AIR USES SPACE AS PLENUM, HAS FACE & BYPASS DAMPERS					

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 1714

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 1714PMP

REFRIGERATION EQUIPMENT SURVEY OBSERVATIONS

CHW PUMP	CHILLER/COMPRESSOR NO.	MECH. ROOM	LOCATION (RM)

UNIT TYPE:

	CENTRIFUGAL WITH WATER SIDE COOLING TOWER		OTHER
	RECIPROCATING WITH WATER SIDE COOLING TOWER	X	AHU'S SERVED AHU-1
	RECIPROCATING WITH AIR COOLED CONDENSING UNIT		
	ABSORPTION WITH WATER SIDE COOLING TOWER		
	AIR COOLED CONDENSING UNIT		
CHW	DX	X	OTHER
			CHW PUMP ONLY

NAMEPLATE:

CHILLER	MFG.		MODEL		SERIAL NO.
VOLTS		AMPS	PH	HZ	CAPACITY (TONS)
CONDENSER FANS	MFG.		MODEL		# OF FANS
VOLTS		AMPS	PH	HZ	HP
CW PUM B & G	MFG.	17B015	MODEL		SERIAL NO.
208 VOLTS	5	AMPS	3 PH	60 HZ	0.75 HP
CNW PUMP	MFG.		MODEL		SERIAL NO.
VOLTS		AMPS	PH	HZ	HP

COMMENTS:

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENT
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	NO TIMECLOCK
REQUIRED START TIME	1200	600	600	600	600	600	900	
REQUIRED STOP TIME	2000	2100	2100	2100	2100	2100	1800	
MONTHS ON:								
J	F	M	A	M	J	J	A	S
0	0	0	0	1	1	1	1	1

CONTROLS:

	PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
SETPOINTS	CWS (oF)		CWR (oF)		CNWS (oF)		CNWR (oF)	
PANEL INDICATORS								
- PRESSURE	LITE-HI		LITE-LOW		GAUGES			
- TEMPERATURE	LITE-HI		LITE-LOW		GAUGES			
- OTHER								

COMMENTS:

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
SETPOINTS		PSIG		HW SUPPLY					
RESET CONTROL (oF)		HW HIGH		HW LOW		OA LOW		OA HIGH	
BURNER CONTROLS		O2 TRIM (Y/N)		OTHER					
COMMENTS: NEW AIR COMPRESSERS, DUAL, ON OLD TANK									

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 1714

EMC NO.: #3204.000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 1714DHW1

DOMESTIC HW SURVEY OBSERVATIONS

DHW-1	BOILER/CONVERTER NO.	MECH RM	LOCATION (RM)
C. PLANT	SOURCE OF HEATING (PLANT)	ALL	SERVES AREA

UNIT TYPE:

NO.2 OIL	NO.6 OIL	N.GAS	ELEC	FUELS:
STM/HW	X	HTHW/HW	OTHER	CONVERTER TYPE:

COMMENT:

NAMEPLATE:

NO NAME PLATE	MFG.	MODEL	520800	CAPACITY OUTPUT (BTUH)
	MFG.	MODEL		CAPACITY OUTPUT (BTUH)

DOMESTIC HW CIRCULATION PUMP: YES

0.083	HW PUMP 1 - HP	TACO	MFG.	MODEL
	HW PUMP 2 - HP		MFG.	MODEL
	HW PUMP 3 - HP		MFG.	MODEL

COMMENT:

DIMENSION:	44	DIAMETER (INCHES)	54	HEIGHT OR LENGTH (INCHES)	600	GALLON
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OPERATION:

HOURS ON:		S	M	T	W	T	F	S	COMMENT		
PRESENT START TIME		0	0	0	0	0	0	0	TIMECLOCK?		
PRESENT STOP TIME		2400	2400	2400	2400	2400	2400	2400	NO		
REQUIRED START TIME		1200	600	600	600	600	600	900			
REQUIRED STOP TIME		2000	2100	2100	2100	2100	2100	1800			
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	1	1	1	1	1	1	1	1

CONTROLS:

X	PNEUMATIC	ELECTRIC	ELEC'NIC	DDC	COMMENTS
SETPOINTS		130	HW SUPPLY		
COMMENTS:					

COMMENTS:

FIELD SURVEY NOTES

BUILDING 1720
AND TYPICAL FOR
1723, 1728, 1729, 1734,
1735, 1761, 1765, 1767,
1769, 1773, AND 1776

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD

BLDG: 1720

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 1720BLG

VI. BUILDING DATA SURVEY OBSERVATIONS

BLDG NO: 1720 BLDG NAME: BARRACKS

ZONE NO.	1		FUNCTION: QUARTERS						
OCCUPANCY HOURS:	M—F	0	TO	2400	SAT	0	TO	2400	
	SUN	0	TO	2400					
PRESENT TEMP	WINTER OCC		°F		UNOCC	°F			
	SUMMER OCC		°F		UNOCC	°F			

ZONE NO.		FUNCTION:						
OCCUPANCY HOURS:	M-F		TO		SAT		TO	
	SUN		TO					
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F			
	SUMMER OCC	°F		UNOCC	°F			

ZONE NO.		FUNCTION:							
OCCUPANCY HOURS:		M—F		TO		SAT		TO	
		SUN		TO					
PRESENT TEMP	WINTER OCC		°F		UNOCC	°F			
	SUMMER OCC		°F		UNOCC	°F			

REMARKS:

COMMENTS:

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 1720

EMC NO.: #3204.000

DATE: Mar-93

PREPARED BY: DR

CHECKED BY: CEL

FILE: 1720CV1

BOILER & CONVERTER SURVEY OBSERVATIONS

CV-1	BOILER/CONVERTER NO.	MECH. RM.	LOCATION (RM)
C.P.	SOURCE OF HEATING (PLANT)	ALL	SERVES AREA

UNIT TYPE:

	STEAM		PSIG		HW		TEMP.		BOILER TYPE:
	NO.2 OIL		NO.6 OIL		N.GAS		ELEC		FUELS:
	STM/HW	X	HTHW/HW		HTHW/STM		OTHER		CONVERTER TYPE:
X	SPACE HEAT		DHW		OTHER				USE:
COMMENT:							0%	% HTG AREA SERVED	
								BB RADIATION ONLY	

NAMEPLATE:

N/A		MFG.	N/A	MODEL	560000	CAPACITY OUTPUT (BTUH)
					560000	CAPACITY INPUT (BTUH)
		MFG.		MODEL		CAPACITY OUTPUT (BTUH)
						CAPACITY INPUT (BTUH)
7.5	HW PUMP 1 – HP	BELL & GOSSETT		MFG.	2BB8–3/4BF	MODEL
	HW PUMP 2 – HP			MFG.		MODEL
	HW PUMP 3 – HP			MFG.		MODEL
COMMENT:		198 GPM				
		DEMAND LIMIT PUMP				

OPERATION:

[illegible]

CONTROLS:

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
SETPOINTS		PSIG	180	HW SUPPLY					HAS O.A. RESET
RESET CONTROL (oF)		HW HIGH		HW LOW		OA LOW		OA HIGH	CONTROL
BURNER CONTROLS		O2 TRIM (Y/N)		OTHER					
COMMENTS: MEASURED HW SUPPLY AT 128°F; HAS SUMMER/WINTER CHANGEOVER VALVE;									
HAS 2-WAY VALVE ON CHILLED WATER RETURN									

COMMENTS:

FIELD SURVEY NOTES

BUILDING 1721
AND TYPICAL FOR
1727, 1736, 1760, 1770, AND 1772

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD

BLDG: 1721

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: DR

CHECKED BY: CEL

FILE: 1721BLG

VI. BUILDING DATA SURVEY OBSERVATIONS

BLDG NO: 1721 BLDG NAME: DAYROOM

ZONE NO.	1	FUNCTION: MAIL/LOUNGE/RECREATION							
OCCUPANCY HOURS:	M – F	600	TO	2100	SAT	600	TO	2100	
	SUN	600	TO	2100					
PRESENT TEMP	WINTER OCC	70.0 °F		UNOCC	70.0 °F				
	SUMMER OCC	°F		UNOCC	°F				

ZONE NO.		FUNCTION:						
OCCUPANCY HOURS:	M-F		TO		SAT		TO	
	SUN		TO					
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F			
	SUMMER OCC	°F		UNOCC	°F			

ZONE NO.		FUNCTION:							
OCCUPANCY HOURS:		M-F		TO		SAT		TO	
		SUN		TO					
PRESENT TEMP	WINTER OCC		°F		UNOCC	°F			
	SUMMER OCC		°F		UNOCC	°F			

REMARKS: 1. HTHW TO HW CONVERTER
2. 2-WAY VALVE ON CHW RETURN
3. EXPANSION TANK WATER LOGGED
4. TIME CLOCK HAS NO PINS
5. CONTROLS OK
6. T'STAT IN RETURN AIR

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 1721

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: DR

CHECKED BY: CEL

FILE: 1721AH1

AIR HANDLING UNIT SURVEY OBSERVATIONS

AHU-1	AHU NO.	MER	LOCATION (RM)
C.PLANT	REF. SYS. SERVING AHU	ALL	SERVES AREA

UNIT TYPE:

X	SINGLE ZN	2-PIPE FC	4-PIPE FC	UNIT HTR	H&V
	MULTIZONE	DOUBLE DT	REHEAT	INDUCTION	VAV
	NUMBER OF ZONES	OTHER			
	COMMENT:				

NAMEPLATE:

TRANE					MFG.	L-8					MODEL
1.5	SUPPLY FAN HP		BALDOR		MFG.	CM3554T					MODEL
	RET/EXH FAN HP				MFG.						MODEL
3490	CFM-HTG	3490	CFM-CLG	10%	MIN %OA	100%	MAX %OA	100%	% HTG AREA SERVED		
COMMENT:											

COILS:

X	NONE		STM		HW		ELEC		MOD VLV	PREHEAT
	NONE		STM	X	HW		ELEC	X	MOD VLV	HEATING
X	NONE		STM		HW		ELEC		MOD VLV	REHEAT
X	NONE		STM		HW		ELEC		MOD VLV	HUMID.
	NONE		DX	X	CW			X	MOD VLV	COOLING

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENTS			
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?			
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	YES			
REQUIRED START TIME	800	1500	1500	1500	1500	0	0	NO PINS			
REQUIRED STOP TIME	2200	2200	2200	2200	2200	2400	2400				
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	1	1	1	1	1	1	1	1

CONTROLS:

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT	X	DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)	N	EA (Y/N)	TSTAT IN
		MA CONTROL		ECONO-DB		ECONO-ENT		OTHER	POOR
DEMAND LIMIT:	X	YES		NO					CONDITION
COMMENTS:									

COMMENTS:

FIELD SURVEY NOTES

BUILDING 1724
AND TYPICAL FOR
1722, 1725, 1726, 1730,
1731, 1732, 1733, 1762,
1763, 1764, 1766, 1768
1771, 1774, AND 1775

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD

BLDG: 1724

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 1724BLG

VI. BUILDING DATA SURVEY OBSERVATIONS

BLDG NO: 1724 BLDG NAME: BARRACKS

ZONE NO.	1	FUNCTION: QUARTERS					
OCCUPANCY HOURS:		M-F	0	TO	2400	SAT	0 TO 2400
		SUN	0	TO	2400		
PRESENT TEMP	WINTER OCC		°F	UNOCC	°F		
	SUMMER OCC		°F	UNOCC	°F		

ZONE NO.	FUNCTION:						
OCCUPANCY HOURS:		M-F		TO		SAT	TO
		SUN		TO			
PRESENT TEMP	WINTER OCC		°F	UNOCC	°F		
	SUMMER OCC		°F	UNOCC	°F		

ZONE NO.	FUNCTION:						
OCCUPANCY HOURS:		M-F		TO		SAT	TO
		SUN		TO			
PRESENT TEMP	WINTER OCC		°F	UNOCC	°F		
	SUMMER OCC		°F	UNOCC	°F		

REMARKS: HW SUPPLY TEMPERATURE MEASURED AT 138 °F
PNEUMATIC CONTROLS ARE IN GOOD CONDITION
HAS O.A. RESET CONTROL ON HW
TWO-WAY VALVE ON CHW RETURN PIPE
SUMMER/WINTER CHANGEOVER VALVE

LOCATION: FT. LEONARD WOOD BLDG: 1724

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: **AJN**

CHECKED BY: CEL

FILE: 1724FC1

AIR HANDLING UNIT SURVEY OBSERVATIONS

FC-1	AHU NO.	THROUGHOUT BLDG	LOCATION (RM)
C.P.	REF. SYS. SERVING AHU	ALL	SERVES AREA

UNIT TYPE:

	SINGLE ZN	X	2-PIPE FC		4-PIPE FC		UNIT HTR		H&V
	MULTIZONE		DOUBLE DT		REHEAT		INDUCTION		VAV
	NUMBER OF ZONES				OTHER				
	COMMENT:	MANUAL SUMMER-WINTER CHANGEOVER							

NAMEPLATE:

					MFG.					MODEL
9.0	SUPPLY FAN HP				MFG.					MODEL
0.0	RET/EXH FAN HP				MFG.					MODEL
19200	CFM-HTG	19200	CFM-CLG	0%	MIN %OA		MAX %OA	100.0%	% HTG AREA SERVED	
COMMENT: TOTAL CFM FOR ALL FAN COILS; TWO-PIPE FAN COIL IN EACH ROOM;										
DAY ROOMS HAVE 2 FAN COILS										

COILS:

X	NONE		STM		HW		ELEC		MOD VLV	PREHEAT
	NONE		STM	X	HW		ELEC		MOD VLV	HEATING
X	NONE		STM		HW		ELEC		MOD VLV	REHEAT
X	NONE		STM		HW		EVAP MEDIA		MOD VLV	HUMID.
	NONE		DX	X	CW				MOD VLV	COOLING

OPERATION:

[illegible]

CONTROLS:

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:	X	SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (°F):	73	OCC HEAT	73	UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (°F):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	NONE	MIN OA (Y/N)		MAX OA (Y/N)		RA (Y/N)		EA (Y/N)	
	NONE	MA CONTROL		ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:		YES	X	NO					
COMMENTS:	THERMOSTAT AND 3-SPEED FAN SWITCH								

FIELD SURVEY NOTES

BUILDING 1740

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD

BLDG: 1740

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 1740BLG

VI. BUILDING DATA SURVEY OBSERVATIONS

BLDG NO: 1740 BLDG NAME: MESS HALL

ZONE NO.	1	FUNCTION: MESS HALL					
OCCUPANCY HOURS:	M-F	400	TO	2400	SAT	400	TO 2400
	SUN	400	TO	2400			
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F		
	SUMMER OCC	°F		UNOCC	°F		

ZONE NO.		FUNCTION:					
OCCUPANCY HOURS:	M-F		TO		SAT		TO
	SUN		TO				
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F		
	SUMMER OCC	°F		UNOCC	°F		

ZONE NO.		FUNCTION:					
OCCUPANCY HOURS:	M-F		TO		SAT		TO
	SUN		TO				
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F		
	SUMMER OCC	°F		UNOCC	°F		

REMARKS:

FILE: 1740HV1

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	N	RA (Y/N)	N	EA (Y/N)	
		MA CONTROL		ECONO – DB		ECONO – ENT		OTHER	
DEMAND LIMIT:	N	YES	N	NO					
COMMENTS:									

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY
CLIENT CONTRACT NO.: DACA 41-92-C-0098
CLIENT PROJ. ENG: DOUG CAGE
LOCATION: FT. LEONARD WOOD BLDG: 1740

DATE: Mar-93
PREPARED BY: AJN
CHECKED BY: CEL
FILE: 1740HV2

HV-2	AHU NO.	MEZZ. MECH. RM	LOCATION (RM)
CV-1	REF. SYS. SERVING AHU	KITCHEN	SERVES AREA

	SINGLE ZN		2-PIPE FC		4-PIPE FC		UNIT HTR	X	H&V
	MULTIZONE		DOUBLE DT		REHEAT		INDUCTION		VAV
	OTHER				OTHER				
	COMMENT:								

ALTON					MFG.	1250-A-5-MIC				MODEL
10.0	SUPPLY FAN HP				MFG.					MODEL
	RET/EXH FAN HP				MFG.					MODEL
10725	CFM-HTG	0	CFM-CLG	100%	MIN %OA	100%	MAX %OA	50.0%	% HTG AREA SERVED	
COMMENT: HAS FACE & BYPASS DAMPER CONTROL										

X	NONE		STM		HW		ELEC		MOD VLV	PREHEAT
	NONE	X	STM		HW		ELEC	X	MOD VLV	HEATING
X	NONE		STM		HW		ELEC		MOD VLV	REHEAT
X	NONE		STM		HW		ELEC		MOD VLV	HUMID.
X	NONE		STM		HW		ELEC		MOD VLV	COOLING

[illegible]

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):	60	HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	N	RA (Y/N)	N	EA (Y/N)	
		MA CONTROL		ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:	N	YES	N	NO					
COMMENTS:									

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
SETPOINTS	15	PSIG		HW SUPPLY					
RESET CONTROL (oF)		HW HIGH		HW LOW		OA LOW		OA HIGH	
BURNER CONTROLS		O2 TRIM (Y/N)		OTHER					
COMMENTS:									

FILE: 1740AH1

		PNEUMATIC		ELECTRIC	X	ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)	N	EA (Y/N)	
	Y	MA CONTROL		ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:	Y	YES		NO					
COMMENTS: O.A. RESET ON HOT DECK									

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 1740

EMC NO.: #3204.000

DATE: Mar-93

PREPARED BY: **AJN**

CHECKED BY: CEL

FILE: 1740DHW1

DOMESTIC HW SURVEY OBSERVATIONS

DHW-1	BOILER/CONVERTER NO.	MECH RM	LOCATION (RM)
C. PLANT	SOURCE OF HEATING (PLANT)	ALL	SERVES AREA

UNIT TYPE:

	NO.2 OIL		NO.6 OIL		N.GAS		ELEC		FUELS:
	STM/HW	X	HTHW/HW		HTHW/STM		OTHER		CONVERTER TYPE:

COMMENT:

NAMEPLATE:

NO NAME PLATE	MFG.		MODEL	1093750	CAPACITY OUTPUT (BTUH)
	MFG.		MODEL		CAPACITY OUTPUT (BTUH)

DOMESTIC HW CIRCULATION PUMP: YES

0.05	HW PUMP 1 – HP	BELL & GOSSETT	MFG.	SLC25	MODEL
	HW PUMP 2 – HP		MFG.		MODEL
	HW PUMP 3 – HP		MFG.		MODEL

COMMENT:

DIMENSION:	66	DIAMETER (INCHES)	96	HEIGHT OR LENGTH (INCHES)	1300 GALLON

OPERATION:

[illegible]

CONTROLS:

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
SETPOINTS				HW SUPPLY					
COMMENTS:									

FIELD SURVEY NOTES

BUILDING 1750

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD

BLDG: 1750

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 1750BLG

VI. BUILDING DATA SURVEY OBSERVATIONS

BLDG NO: 1750 BLDG NAME: ADMINISTRATION

ZONE NO.	1		FUNCTION: OFFICES (FORMERLY A MESS HALL)						
OCCUPANCY HOURS:	M – F	700	TO	1600	SAT	0	TO	0	
	SUN	0	TO	0					
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F				
	SUMMER OCC	°F		UNOCC	°F				

ZONE NO.		FUNCTION:							
OCCUPANCY HOURS:		M-F		TO		SAT		TO	
		SUN		TO					
PRESENT TEMP	WINTER OCC		°F		UNOCC	°F			
	SUMMER OCC		°F		UNOCC	°F			

ZONE NO.		FUNCTION:							
OCCUPANCY HOURS:		M-F		TO		SAT		TO	
		SUN		TO					
PRESENT TEMP	WINTER OCC		°F		UNOCC	°F			
	SUMMER OCC		°F		UNOCC	°F			

REMARKS: SAME BUILDING CONSTRUCTION AND AIR SYSTEMS AS 1740 (MESS HALL)
CONTROLS ARE IN GOOD CONDITION
HV-2 IS RUNNING, BUT DOES NOT SERVE ANY OFFICE SPACE. HV-2 SHOULD BE SHUT OFF.
GROUND FLOOR MECHANICAL ROOM IS IN POOR CONDITION:

- HW LEAKING OUT ONTO FLOOR
- NO INSULATION ON HTHW/STM GENERATOR
- INSULATION FALLING OFF PIPING
- LARGE DHW TANK IS OPERATING, OVERSIZED FOR CURRENT USE

FILE: 1750AH1

CONTROLS:									
		PNEUMATIC		ELECTRIC	X	ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)	N	EA (Y/N)	
	Y	MA CONTROL		ECONO - DB		ECONO - ENT		OTHER	
DEMAND LIMIT:	Y	YES		NO					
COMMENTS: O.A. RESET ON HOT DECK									

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 1750

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 1750AH2

AIR HANDLING UNIT SURVEY OBSERVATIONS

AHU-2	AHU NO.	MEZZ. MECH. RM	LOCATION (RM)
	REF. SYS. SERVING AHU	OFFICES	SERVES AREA

UNIT TYPE:

	SINGLE ZN		2-PIPE FC		4-PIPE FC		UNIT HTR		H&V
X	MULTIZONE		DOUBLE DT		REHEAT		INDUCTION		VAV
6	NUMBER OF ZONES				OTHER				
	COMMENT:								

NAMEPLATE:

TRANE					MFG.	LZ-31				MODEL
7.5	SUPPLY FAN HP		MARATHON		MFG.	DL213TTDR7359AAWF1				MODEL
	RET/EXH FAN HP				MFG.					MODEL
14000	CFM-HTG	14000	CFM-CLG	50%	MIN %OA	100%	MAX %OA	50%	% HTG AREA SERVED	

COMMENT:

COILS:

X	NONE		STM		HW		ELEC		MOD VLV	PREHEAT
	NONE	X	STM		HW		ELEC	X	MOD VLV	HEATING
X	NONE		STM		HW		ELEC		MOD VLV	REHEAT
X	NONE		STM		HW		ELEC		MOD VLV	HUMID.
	NONE		DX	X	CW				MOD VLV	COOLING

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENTS
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	NO
REQUIRED START TIME	0	700	700	700	700	700	0	
REQUIRED STOP TIME	0	1600	1600	1600	1600	1600	0	

MONTHS ON:

J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	1	1	1	1	1	1	1	1

CONTROLS:

		PNEUMATIC		ELECTRIC	X	ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)	N	EA (Y/N)	
	Y	MA CONTROL		ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:	Y	YES		NO					

COMMENTS: O.A. RESET ON HOT DECK

FILE: 1750HV1

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	N	RA (Y/N)	N	EA (Y/N)	
		MA CONTROL		ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:	N	YES	N	NO					
COMMENTS:									

LOCATION: FT. LEONARD WOOD BLDG: 1750

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: **AJN**

CHECKED BY: CEL

FILE: 1750HV2

AIR HANDLING UNIT SURVEY OBSERVATIONS

HV-2	AHU NO.	MEZZ. MECH. RM	LOCATION (RM)
CV-1	REF. SYS. SERVING AHU	NOTHING	SERVES AREA

UNIT TYPE:

	SINGLE ZN		2—PIPE FC		4—PIPE FC		UNIT HTR	X	H&V
	MULTIZONE		DOUBLE DT		REHEAT		INDUCTION		VAV
	OTHER				OTHER				
	COMMENT:								

NAMEPLATE:

ALTON					MFG.	1250-A-5-MIC				MODEL
10.0	SUPPLY FAN HP				MFG.					MODEL
	RET/EXH FAN HP				MFG.					MODEL
10725	CFM-HTG	0	CFM-CLG	100%	MIN %OA	100%	MAX %OA	50.0%	% HTG AREA SERVED	
COMMENT: HAS FACE & BYPASS DAMPER CONTROL										

COILS:

X	NONE		STM		HW		ELEC		MOD VLV	PREHEAT
	NONE	X	STM		HW		ELEC	X	MOD VLV	HEATING
X	NONE		STM		HW		ELEC		MOD VLV	REHEAT
X	NONE		STM		HW		ELEC		MOD VLV	HUMID.
X	NONE		STM		HW		ELEC		MOD VLV	COOLING

OPERATION:

[illegible]

CONTROLS:

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):	60	HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	N	RA (Y/N)	N	EA (Y/N)	
		MA CONTROL		ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:	N	YES	N	NO					
COMMENTS: HV-2 DOES NOT SERVE AN AREA IN THE BUILDING (PREVIOUSLY FOR A KITCHEN HOOD)									

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
SETPOINTS	15	PSIG		HW SUPPLY					
RESET CONTROL (oF):		HW HIGH		HW LOW		OA LOW		OA HIGH	
BURNER CONTROLS		O2 TRIM (Y/N)		OTHER					
COMMENTS:									

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 1750

EMC NO.: #3204.000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 1750DHW1

DOMESTIC HW SURVEY OBSERVATIONS

DHW-1	BOILER/CONVERTER NO.	MECH RM	LOCATION (RM)
C. PLANT	SOURCE OF HEATING (PLANT)	ALL	SERVES AREA

UNIT TYPE:

NO.2 OIL		NO.6 OIL		N.GAS		ELEC		FUELS:
STM/HW	X	HTHW/HW		HTHW/STM		OTHER		CONVERTER TYPE:

COMMENT:

NAMEPLATE:

NO NAME PLATE	MFG.		MODEL	1093750	CAPACITY OUTPUT (BTUH)
	MFG.		MODEL		CAPACITY OUTPUT (BTUH)

DOMESTIC HW CIRCULATION PUMP: YES

0.05	HW PUMP 1 - HP	BELL & GOSSETT	MFG.	SLC25	MODEL
	HW PUMP 2 - HP		MFG.		MODEL
	HW PUMP 3 - HP		MFG.		MODEL

COMMENT:

DIMENSION:	66	DIAMETER (INCHES)	96	HEIGHT OR LENGTH (INCHES)	1300	GALLON
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OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENT
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	NO
REQUIRED START TIME	0	700	700	700	700	700	0	
REQUIRED STOP TIME	0	1600	1600	1600	1600	1600	0	

MONTHS ON:

J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	1	1	1	1	1	1	1	1

CONTROLS:

X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
SETPOINTS			HW SUPPLY					

COMMENTS:

FIELD SURVEY NOTES

BUILDING 2100

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD

BLDG: 2100

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 2100BLG

VI. BUILDING DATA SURVEY OBSERVATIONS

BLDG NO: 2100

BLDG NAME: RECEPTION CENTER

ZONE NO.	1	FUNCTION: OFFICES / MEDICAL / CLOTHING ISSUE / PX / AUDITORIUM							
OCCUPANCY HOURS:		M-F	700	TO	1700	SAT	0	TO	0
		SUN	0	TO	0				
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F				
	SUMMER OCC	°F		UNOCC	°F				

ZONE NO.	FUNCTION:								
OCCUPANCY HOURS:		M-F		TO		SAT		TO	
		SUN		TO					
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F				
	SUMMER OCC	°F		UNOCC	°F				

ZONE NO.	FUNCTION:								
OCCUPANCY HOURS:		M-F		TO		SAT		TO	
		SUN		TO					
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F				
	SUMMER OCC	°F		UNOCC	°F				

REMARKS:

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 2100

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 2100AH1

AIR HANDLING UNIT SURVEY OBSERVATIONS

AHU-1	AHU NO.	WEST MECH. RM	LOCATION (RM)
CH-1, CH-2	REF. SYS. SERVING AHU	ADMIN. OFFICES	SERVES AREA

UNIT TYPE:

SINGLE ZN	2-PIPE FC	4-PIPE FC	UNIT HTR	H&V
MULTIZONE	DOUBLE DT	REHEAT	INDUCTION	X VAV
NUMBER OF ZONES	OTHER			
COMMENT:	VARIABLE INLET VANES ON FAN; 7 VAV BOXES			

NAMEPLATE:

					MFG.					MODEL
7.5	SUPPLY FAN HP		CENTURY		MFG.	6-357721-1				MODEL
	RET/EXH FAN HP				MFG.					MODEL
6430	CFM-HTG	6430	CFM-CLG	10%	MIN %OA	100%	MAX %OA	12.5%	% HTG AREA SERVED	

COMMENT:

COILS:

X	NONE	STM	HW	ELEC	MOD VLV	PREHEAT
X	NONE	STM	HW	ELEC	MOD VLV	HEATING
X	NONE	STM	HW	ELEC	MOD VLV	REHEAT
X	NONE	STM	HW	ELEC	MOD VLV	HUMID.
	NONE	DX	X CW		MOD VLV	COOLING

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENTS
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	YES,
REQUIRED START TIME	0	700	700	700	700	700	0	NO PINS
REQUIRED STOP TIME	0	1700	1700	1700	1700	1700	0	

MONTHS ON:

J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	1	1	1	1	1	1	1	1

CONTROLS:

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)	N	EA (Y/N)	
	Y	MA CONTROL	Y	ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:	Y	(Y / N)							

COMMENTS:

FILE: 2100AH2

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:	X	SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)	Y	EA (Y/N)	
	Y	MA CONTROL	Y	ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:	Y	(Y / N)							
COMMENTS:									

FILE: 2100AH3

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:	X	SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)	N	EA (Y/N)	
	Y	MA CONTROL	Y	ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:	Y	(Y / N)							
COMMENTS:									

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 2100

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 2100AH4

AIR HANDLING UNIT SURVEY OBSERVATIONS

AHU-4	AHU NO.	WAREHOUSE MECH. RM	LOCATION (RM)
CH-1, CH-2	REF. SYS. SERVING AHU	ASSEMBLY AREA	SERVES AREA

UNIT TYPE:

	SINGLE ZN		2-PIPE FC		4-PIPE FC		UNIT HTR		H&V
	MULTIZONE		DOUBLE DT		REHEAT		INDUCTION	X	VAV
	NUMBER OF ZONES			OTHER					
	COMMENT: VARIABLE INLET VANES ON FAN; 7 VAV BOXES								

NAMEPLATE:

McQUAY					MFG.	MSL12DV				MODEL
7.5	SUPPLY FAN HP		MARATHON		MFG.	6-357721-01				MODEL
	RET/EXH FAN HP				MFG.					MODEL
12690	CFM-HTG	12690	CFM-CLG	10%	MIN %OA	100%	MAX %OA	18.9%	% HTG AREA SERVED	
COMMENT:										

COILS:

X	NONE	STM	HW	ELEC	MOD VLV	PREHEAT
	NONE	STM	X HW	ELEC	X MOD VLV	HEATING
X	NONE	STM	HW	ELEC	MOD VLV	REHEAT
X	NONE	STM	HW	ELEC	MOD VLV	HUMID.
	NONE	DX	X CW		X MOD VLV	COOLING

OPERATION:

OPERATION:											
HOURS ON:	S	M	T	W	T	F	S	COMMENTS			
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?			
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	YES,			
REQUIRED START TIME	0	700	700	700	700	700	0	NO PINS			
REQUIRED STOP TIME	0	1700	1700	1700	1700	1700	0				
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	1	1	1	1	1	1	1	1

CONTROLS:

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:	X	SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)	Y	EA (Y/N)	
	Y	MA CONTROL	Y	ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:	Y	(Y / N)							

COMMENTS:

FILE: 2100AH5

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:	X	SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)	N	EA (Y/N)	
	Y	MA CONTROL	N	ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:	Y	(Y / N)							
COMMENTS:									

FILE: 2100AH6

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:	X	SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)	Y	EA (Y/N)	
	Y	MA CONTROL	Y	ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:	Y	(Y / N)							
COMMENTS:									

CONTROLS:

LOCATION: FT. LEONARD WOOD BLDG: 2100

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: **AJN**

CHECKED BY: CEL

FILE: 2100AH8

AIR HANDLING UNIT SURVEY OBSERVATIONS

AHU-8	AHU NO.	AUDITORIUM MECH. RM	LOCATION (RM)
CH-1, CH-2	REF. SYS. SERVING AHU	AUDITORIUM	SERVES AREA

UNIT TYPE:

X	SINGLE ZN	2-PIPE FC	4-PIPE FC	UNIT HTR	H&V
	MULTIZONE	DOUBLE DT	REHEAT	INDUCTION	VAV
	NUMBER OF ZONES		OTHER		
	COMMENT:				

NAMEPLATE:

McQUAY					MFG.	LSL111CV				MODEL
5.0	SUPPLY FAN HP		CENTURY		MFG.	6-357719-01				MODEL
	RET/EXH FAN HP				MFG.					MODEL
6000	CFM-HTG	6000	CFM-CLG	20%	MIN %OA	100%	MAX %OA	5.0%	% HTG AREA SERVED	

COMMENT:

COILS:

X	NONE		STM		HW		ELEC		MOD VLV	PREHEAT
	NONE		STM	X	HW		ELEC	X	MOD VLV	HEATING
X	NONE		STM		HW		ELEC		MOD VLV	REHEAT
X	NONE		STM		HW		ELEC		MOD VLV	HUMID.
	NONE		DX	X	CW			X	MOD VLV	COOLING

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENTS
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	YES,
REQUIRED START TIME	0	700	700	700	700	700	0	NO PINS
REQUIRED STOP TIME	0	1700	1700	1700	1700	1700	0	

MONTHS ON:

[illegible]

CONTROLS:

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:	X	SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)	N	EA (Y/N)	
	Y	MA CONTROL	N	ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:	Y	(Y / N)							

COMMENTS:

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY
CLIENT CONTRACT NO.: DACA 41-92-C-0098
CLIENT PROJ. ENG: DOUG CAGE
LOCATION: FT. LEONARD WOOD BLDG: 2100

EMC NO.: #3204-000
DATE: Mar-93
PREPARED BY: AJN
CHECKED BY: CEL
FILE: 2100AH9

AIR HANDLING UNIT SURVEY OBSERVATIONS			
AHU-9	AHU NO.	AUDITORIUM MECH. RM	LOCATION (RM)
CH-1. CH-2	REF. SYS. SERVING AHU	AUDITORIUM	SERVES AREA

UNIT TYPE:									
X	SINGLE ZN		2-PIPE FC		4-PIPE FC		UNIT HTR		H&V
	MULTIZONE		DOUBLE DT		REHEAT		INDUCTION		VAV
	NUMBER OF ZONES				OTHER				
	COMMENT:								

NAMEPLATE:										
McQUAY					MFG.	LSL111CV				MODEL
5.0	SUPPLY FAN HP		CENTURY		MFG.	6-357719-01				MODEL
	RET/EXH FAN HP				MFG.					MODEL
6000	CFM-HTG	6000	CFM-CLG	20%	MIN %OA	100%	MAX %OA	5.0%	% HTG AREA SERVED	
COMMENT:										

COILS:										
X	NONE		STM		HW		ELEC		MOD VLV	PREHEAT
	NONE		STM	X	HW		ELEC	X	MOD VLV	HEATING
X	NONE		STM		HW		ELEC		MOD VLV	REHEAT
X	NONE		STM		HW		ELEC		MOD VLV	HUMID.
	NONE		DX	X	CW			X	MOD VLV	COOLING

[illegible]

CONTROLS:									
	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:	X	SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)	N	EA (Y/N)	
	Y	MA CONTROL	N	ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:	Y	(Y / N)							
COMMENTS:									

FILE: 2100BLR

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
SETPOINTS		PSIG		HW SUPPLY					
RESET CONTROL (oF)		HW HIGH		HW LOW		OA LOW		OA HIGH	
BURNER CONTROLS	N	O2 TRIM (Y/N)		OTHER					
COMMENTS:									

COMMENTS:

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 2100

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 2100CH1

REFRIGERATION EQUIPMENT SURVEY OBSERVATIONS

CH-1	CHILLER/COMPRESSOR NO.	OUTSIDE BLDG	LOCATION (RM)

UNIT TYPE:

	CENTRIFUGAL WITH WATER SIDE COOLING TOWER		OTHER
	RECIPROCATING WITH WATER SIDE COOLING TOWER	X	AHU'S SERVED AHUs 1 THRU 9
X	RECIPROCATING WITH AIR COOLED CONDENSING UNIT		
	ABSORPTION WITH WATER SIDE COOLING TOWER		
	AIR COOLED CONDENSING UNIT		
X	CHW	DX	OTHER

NAMEPLATE:

CHILLER	McQUAY	MFG.	ALRO95C			MODEL	55F0712100			SERIAL NO.
460	VOLTS	100	AMPS	3	PH	60	HZ	95	CAPACITY (TONS)	
CONDENSER FANS		MFG.				MODEL				10 # OF FANS
460	VOLTS	2	AMPS	3	PH	60	HZ	1	HP	
DTW PUMP		MFG.				MODEL				SERIAL NO.
	VOLTS		AMPS		PH		HZ		HP	
CNW PUMP		MFG.				MODEL				SERIAL NO.
	VOLTS		AMPS		PH		HZ		HP	

COMMENTS:

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENT			
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?			
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	NO			
REQUIRED START TIME	0	700	700	700	700	700	0				
REQUIRED STOP TIME	0	1700	1700	1700	1700	1700	0				
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
0	0	0	0	1	1	1	1	1	0	0	0

CONTROLS:

	PNEUMATIC	X	ELECTRIC	ELEC'NIC	DDC	COMMENTS
SETPOINTS	CWS (oF)		CWR (oF)	CNWS (oF)	CNWR (oF)	
PANEL INDICATORS						
- PRESSURE	LITE-HI		LITE-LOW	GAUGES		
- TEMPERATURE	LITE-HI		LITE-LOW	GAUGES		
- OTHER						
COMMENTS:	FM RADIO CONTROL					

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 2100

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 2100CH2

REFRIGERATION EQUIPMENT SURVEY OBSERVATIONS

CH-2	CHILLER/COMPRESSOR NO.	OUTSIDE BLDG	LOCATION (RM)

UNIT TYPE:

	CENTRIFUGAL WITH WATER SIDE COOLING TOWER		OTHER
	RECIPROCATING WITH WATER SIDE COOLING TOWER	X	AHU'S SERVED AHUs 1 THRU 9
X	RECIPROCATING WITH AIR COOLED CONDENSING UNIT		
	ABSORPTION WITH WATER SIDE COOLING TOWER		
	AIR COOLED CONDENSING UNIT		
X	CHW	DX	OTHER

NAMEPLATE:

CHILLER		McQUAY	MFG.	ALRO95C			MODEL	55F0712100			SERIAL NO.	
460	VOLTS		100	AMPS	3	PH	60	HZ	95	CAPACITY (TONS)		
CONDENSER FANS			MFG.				MODEL				10	# OF FANS
460	VOLTS		2	AMPS	3	PH	60	HZ	1	HP		
DTW PUMP			MFG.				MODEL				SERIAL NO.	
	VOLTS			AMPS		PH		HZ		HP		
CNW PUMP			MFG.				MODEL				SERIAL NO.	
	VOLTS			AMPS		PH		HZ		HP		

COMMENTS:

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENT			
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?			
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	NO			
REQUIRED START TIME	0	700	700	700	700	700	0				
REQUIRED STOP TIME	0	1700	1700	1700	1700	1700	0				
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
0	0	0	0	1	1	1	1	1	0	0	0

CONTROLS:

	PNEUMATIC	X	ELECTRIC	ELEC'NIC	DDC	COMMENTS
SETPOINTS	CWS (oF)		CWR (oF)	CNWS (oF)	CNWR (oF)	
PANEL INDICATORS						
- PRESSURE	LITE-HI		LITE-LOW	GAUGES		
- TEMPERATURE	LITE-HI		LITE-LOW	GAUGES		
- OTHER						
COMMENTS:	FM RADIO CONTROL					

FIELD SURVEY NOTES

BUILDING 2105

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD

BLDG: 2105

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 2105BLG

VI. BUILDING DATA SURVEY OBSERVATIONS

BLDG NO: 2105 BLDG NAME: MESS HALL

ZONE NO.	1	FUNCTION: KITCHEN AND DINING					
OCCUPANCY HOURS:	M-F	400	TO	2000	SAT	400	TO 2000
	SUN	400	TO	2000			
PRESENT TEMP	WINTER OCC	75.0 °F		UNOCC	°F		
	SUMMER OCC	°F		UNOCC	°F		

ZONE NO.		FUNCTION:					
OCCUPANCY HOURS:	M-F		TO		SAT		TO
	SUN		TO				
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F		
	SUMMER OCC	°F		UNOCC	°F		

ZONE NO.		FUNCTION:					
OCCUPANCY HOURS:	M-F		TO		SAT		TO
	SUN		TO				
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F		
	SUMMER OCC	°F		UNOCC	°F		

REMARKS: SAME AS BUILDING 630

FILE: 2105AH3

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:	X	SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)	N	EA (Y/N)	
		MA CONTROL		ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:	Y	(Y/N)							
COMMENTS:									

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
SETPOINTS		PSIG		HW SUPPLY					
RESET CONTROL (oF)	N	HW HIGH	N	HW LOW	N	OA LOW	N	OA HIGH	
BURNER CONTROLS		O2 TRIM (Y/N)		OTHER					
COMMENTS:									

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY
CLIENT CONTRACT NO.: DACA 41-92-C-0098
CLIENT PROJ. ENG: DOUG CAGE
LOCATION: FT. LEONARD WOOD BLDG: 2105

EMC NO.: #3204-000
DATE: Mar-93
PREPARED BY: AJN
CHECKED BY: CEL
FILE: 2105AH1

AHU-1	AHU NO.	MECH. ROOM	LOCATION (RM)
ACCU-1	REF. SYS. SERVING AHU	DINING HALL	SERVES AREA

X	SINGLE ZN		2-PIPE FC		4-PIPE FC		UNIT HTR		H&V
	MULTIZONE		DOUBLE DT		REHEAT		INDUCTION		VAV
	NUMBER OF ZONES				OTHER				
	COMMENT:								

TRANE					MFG.					MODEL
15.0	SUPPLY FAN HP		MARATHON		MFG.	VVB254TTDR5026AAL				MODEL
	RET/EXH FAN HP				MFG.					MODEL
11000	CFM-HTG	11000	CFM-CLG	20%	MIN %OA	100%	MAX %OA	50%	% HTG AREA SERVED	
COMMENT:										

X	NONE		STM		HW		ELEC		MOD VLV	PREHEAT
	NONE	X	STM		HW		ELEC	X	MOD VLV	HEATING
X	NONE		STM		HW		ELEC		MOD VLV	REHEAT
X	NONE		STM		HW		ELEC		MOD VLV	HUMID.
	NONE	X	DX		CW			X	MOD VLV	COOLING

[illegible]

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:	X	SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)	Y	EA (Y/N)	
	Y	MA CONTROL	Y	ECONO – DB		ECONO – ENT		OTHER	
DEMAND LIMIT:	Y	(Y/N)							
COMMENTS:									

FILE: 2105AH2

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:	X	SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)	Y	EA (Y/N)	
	Y	MA CONTROL	Y	ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:	Y	(Y/N)							
COMMENTS:									

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 2105

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 2105CH1

REFRIGERATION EQUIPMENT SURVEY OBSERVATIONS

ACCU-1	CHILLER/COMPRESSOR NO.	OUTSIDE BLDG	LOCATION (RM)

UNIT TYPE:

	CENTRIFUGAL WITH WATER SIDE COOLING TOWER		OTHER
	RECIPROCATING WITH WATER SIDE COOLING TOWER	X	AHU'S SERVED AHU-1
	RECIPROCATING WITH AIR COOLED CONDENSING UNIT		
	ABSORPTION WITH WATER SIDE COOLING TOWER		
X	AIR COOLED CONDENSING UNIT		
	CHW	X	DX
			OTHER

NAMEPLATE:

CHILLER	TRANE	MFG.	RAUBC404BE10	MODEL	J89D80590	SERIAL NO.
460	VOLTS	32.8	AMPS	3	PH	60
						HZ
						38.5
						CAPACITY (TONS)
CONDENSER FANS	MFG.			MODEL		4
						# OF FANS
460	VOLTS	1.8	AMPS	3	PH	60
						HZ
						1
						HP
CW PUMP	MFG.			MODEL		SERIAL NO.
	VOLTS		AMPS		PH	
						HZ
						HP
CNW PUMP	MFG.			MODEL		SERIAL NO.
	VOLTS		AMPS		PH	
						HZ
						HP

COMMENTS:

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENT
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	NO
REQUIRED START TIME	500	500	500	500	500	500	500	
REQUIRED STOP TIME	1900	1900	1900	1900	1900	1900	1900	
MONTHS ON:	J	F	M	A	M	J	J	A
	0	0	0	0	1	1	1	1
								S
								O
								N
								D
								0
								0
								0

CONTROLS:

	PNEUMATIC	X	ELECTRIC	ELEC'NIC	DDC	COMMENTS
SETPOINTS	CWS (oF)		CWR (oF)	CNWS (oF)	CNWR (oF)	
PANEL INDICATORS						
- PRESSURE	LITE-HI		LITE-LOW	GAUGES		
- TEMPERATURE	LITE-HI		LITE-LOW	GAUGES		
- OTHER						

COMMENTS: FM RADIO CONTROL

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 2105

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 2105CH2

REFRIGERATION EQUIPMENT SURVEY OBSERVATIONS

ACCU-2	CHILLER/COMPRESSOR NO.	OUTSIDE BLDG	LOCATION (RM)

UNIT TYPE:

	CENTRIFUGAL WITH WATER SIDE COOLING TOWER		OTHER
	RECIPROCATING WITH WATER SIDE COOLING TOWER	X	AHU'S SERVED AHU-2
	RECIPROCATING WITH AIR COOLED CONDENSING UNIT		
	ABSORPTION WITH WATER SIDE COOLING TOWER		
X	AIR COOLED CONDENSING UNIT		
	CHW	X	DX
			OTHER

NAMEPLATE:

CHILLER	TRANE	MFG.	RAUBC404BE10	MODEL	J89D80590	SERIAL NO.
460	VOLTS	32.8	AMPS	3	PH	60
						HZ
						38.5
						CAPACITY (TONS)
CONDENSER FANS	MFG.			MODEL		4
						# OF FANS
460	VOLTS	1.8	AMPS	3	PH	60
						HZ
						1
						HP
CW PUMP	MFG.			MODEL		SERIAL NO.
	VOLTS		AMPS		PH	
						HZ
						HP
CNW PUMP	MFG.			MODEL		SERIAL NO.
	VOLTS		AMPS		PH	
						HZ
						HP

COMMENTS:

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENT
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	NO
REQUIRED START TIME	500	500	500	500	500	500	500	
REQUIRED STOP TIME	1900	1900	1900	1900	1900	1900	1900	
MONTHS ON:	J	F	M	A	M	J	J	A
	0	0	0	0	1	1	1	1
								S
								O
								N
								D
								0
								0
								0

CONTROLS:

	PNEUMATIC	X	ELECTRIC	ELEC'NIC	DDC	COMMENTS
SETPOINTS	CWS (oF)		CWR (oF)	CNWS (oF)	CNWR (oF)	
PANEL INDICATORS						
- PRESSURE	LITE-HI		LITE-LOW	GAUGES		
- TEMPERATURE	LITE-HI		LITE-LOW	GAUGES		
- OTHER						
COMMENTS:	FM RADIO CONTROL					

FIELD SURVEY NOTES

BUILDING 2240

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD

BLDG: 2240

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 2240BLG

VI. BUILDING DATA SURVEY OBSERVATIONS

BLDG NO: 2240 BLDG NAME: MP KENNEL

ZONE NO.	1	FUNCTION: OFFICE / DOG KENNEL						
OCCUPANCY HOURS:	M-F	800	TO	1700	SAT	0	TO	0
	SUN	0	TO	0				
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F			
	SUMMER OCC	°F		UNOCC	°F			

ZONE NO.	FUNCTION:							
OCCUPANCY HOURS:	M-F		TO		SAT		TO	
	SUN		TO					
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F			
	SUMMER OCC	°F		UNOCC	°F			

ZONE NO.	FUNCTION:							
OCCUPANCY HOURS:	M-F		TO		SAT		TO	
	SUN		TO					
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F			
	SUMMER OCC	°F		UNOCC	°F			

REMARKS:

FILE: 2240AH1

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	N	MAX OA (Y/N)	N	RA (Y/N)	N	EA (Y/N)	
		MA CONTROL		ECONO – DB		ECONO – ENT		OTHER	
DEMAND LIMIT:	Y	(Y/N)							
COMMENTS:									

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 2240

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 2240CH1

REFRIGERATION EQUIPMENT SURVEY OBSERVATIONS

DX-1	CHILLER/COMPRESSOR NO.	OUTSIDE BLDG	LOCATION (RM)

UNIT TYPE:

CENTRIFUGAL WITH WATER SIDE COOLING TOWER		OTHER
RECIPROCATING WITH WATER SIDE COOLING TOWER	X	AHU'S SERVED AHU-1
RECIPROCATING WITH AIR COOLED CONDENSING UNIT		
ABSORPTION WITH WATER SIDE COOLING TOWER		
AIR COOLED CONDENSING UNIT		
CHW	X	DX
		OTHER

NAMEPLATE:

CHILLER	MFG.	NO NAME PLATE	MODEL	SERIAL NO.
VOLTS		MCA	PH	HZ
				2 CAPACITY (TONS)
CONDENSER FANS	MFG.		MODEL	# OF FANS
VOLTS		AMPS	PH	HZ
				HP
DTW PUMP	MFG.		MODEL	SERIAL NO.
VOLTS		AMPS	PH	HZ
				HP
CNW PUMP	MFG.		MODEL	SERIAL NO.
VOLTS		AMPS	PH	HZ
				HP

COMMENTS:

OPERATION:

OPERATION											
HOURS ON:	S	M	T	W	T	F	S	COMMENT			
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?			
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400				
REQUIRED START TIME	0	800	800	800	800	800	0				
REQUIRED STOP TIME	0	1700	1700	1700	1700	1700	0				
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
0	0	0	0	1	1	1	1	1	0	0	0

CONTROLS:

	PNEUMATIC	X	ELECTRIC	ELEC'NIC	DDC	COMMENTS
SETPOINTS	CWS (oF)		CWR (oF)	CNWS (oF)	CNWR (oF)	
PANEL INDICATORS						
- PRESSURE	LITE-HI		LITE-LOW	GAUGES		
- TEMPERATURE	LITE-HI		LITE-LOW	GAUGES		
- OTHER						

COMMENTS:

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY
CLIENT CONTRACT NO.: DACA 41-92-C-0098
CLIENT PROJ. ENG: DOUG CAGE
LOCATION: FT. LEONARD WOOD BLDG: 2240

EMC NO.: #3204-000
DATE: Mar-93
PREPARED BY: DR
CHECKED BY: CEL
FILE: 2240UH1

UH-1	AHU NO.	DOG KENNEL	LOCATION (RM)
	REF. SYS. SERVING AHU	DOG KENNEL	SERVES AREA

	SINGLE ZN	2-PIPE FC	4-PIPE FC	X	UNIT HTR	H&V
	MULTIZONE	DOUBLE DT	REHEAT		INDUCTION	VAV
	NUMBER OF ZONES		OTHER			
	COMMENT:	GAS-FIRED UNIT HEATER (CEILING MOUNTED) FUEL TYPE: PROPANE				

HYDROTHERM					MFG.	M-100B					MODEL
0.3	SUPPLY FAN HP				MFG.						MODEL
	RET/EXH FAN HP				MFG.						MODEL
400	CFM-HTG	0	CFM-CLG	0%	MIN %OA	0%	MAX %OA	11.6%	% HTG AREA SERVED		
COMMENT:											

X	NONE		STM		HW		ELEC		MOD VLV	PREHEAT
X	NONE		FUEL OIL		HW		ELEC		MOD VLV	HEATING
X	NONE		STM		HW		ELEC		MOD VLV	REHEAT
X	NONE		STM		HW		EVAP MEDIA		MOD VLV	HUMID.
X	NONE		DX		CW				MOD VLV	COOLING

HOURS ON:		S	M	T	W	T	F	S	COMMENTS		
PRESENT START TIME		0	0	0	0	0	0	0	TIMECLOCK?		
PRESENT STOP TIME		2400	2400	2400	2400	2400	2400	2400	NO		
REQUIRED START TIME		0	0	0	0	0	0	0			
REQUIRED STOP TIME		2400	2400	2400	2400	2400	2400	2400			
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	0	0	0	0	0	1	1	1

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (°F):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (°F):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	N	MAX OA (Y/N)	N	RA (Y/N)	N	EA (Y/N)	
		MA CONTROL		ECONO – DB		ECONO – ENT		OTHER	
DEMAND LIMIT:	N	(Y/N)		NO					
COMMENTS:									

FILE: 2240UH2

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (°F):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (°F):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	N	MAX OA (Y/N)	N	RA (Y/N)	N	EA (Y/N)	
		MA CONTROL		ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:	N	(Y/N)		NO					
COMMENTS:									

LOCATION: FT. LEONARD WOOD BLDG: 2240

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: DR

CHECKED BY: CEL

FILE: 2240UH3

AIR HANDLING UNIT SURVEY OBSERVATIONS

UH-3	AHU NO.	DOG KENNEL	LOCATION (RM)
	REF. SYS. SERVING AHU	DOG KENNEL	SERVES AREA

UNIT TYPE:

	SINGLE ZN		2-PIPE FC		4-PIPE FC	X	UNIT HTR		H&V
	MULTIZONE		DOUBLE DT		REHEAT		INDUCTION		VAV
	NUMBER OF ZONES				OTHER				
	COMMENT:	GAS-FIRED UNIT HEATER (CEILING MOUNTED) FUEL TYPE: PROPANE							

NAMEPLATE:

HYDROTHERM					MFG.	M-100B				MODEL
0.3	SUPPLY FAN HP				MFG.					MODEL
	RET/EXH FAN HP				MFG.					MODEL
400	CFM-H TG	0	CFM-CLG	0%	MIN %OA	0%	MAX %OA	11.6%	% HTG AREA SERVED	

COMMENT:

COILS:

X	NONE		STM		HW		ELEC		MOD VLV	PREHEAT
X	NONE		FUEL OIL		HW		ELEC		MOD VLV	HEATING
X	NONE		STM		HW		ELEC		MOD VLV	REHEAT
X	NONE		STM		HW		EVAP MEDIA		MOD VLV	HUMID.
X	NONE		DX		CW				MOD VLV	COOLING

OPERATION:

OPERATION:											
HOURS ON:		S	M	T	W	T	F	S	COMMENTS		
PRESENT START TIME		0	0	0	0	0	0	0	TIMECLOCK?		
PRESENT STOP TIME		2400	2400	2400	2400	2400	2400	2400	NO		
REQUIRED START TIME		0	0	0	0	0	0	0			
REQUIRED STOP TIME		2400	2400	2400	2400	2400	2400	2400			
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	0	0	0	0	0	1	1	1

CONTROLS:

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (°F):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (°F):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	N	MAX OA (Y/N)	N	RA (Y/N)	N	EA (Y/N)	
		MA CONTROL		ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:	N	(Y/N)		NO					

COMMENTS:

FIELD SURVEY NOTES

BUILDING 2250

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD

BLDG: 2250

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 2250BLG

VI. BUILDING DATA SURVEY OBSERVATIONS

BLDG NO: 2250

BLDG NAME: MOTOR POOL

ZONE NO.	1		FUNCTION: VEHICLE MAINTENANCE						
OCCUPANCY HOURS:	M—F	700	TO	1600	SAT	0	TO	0	
	SUN	0	TO	0					
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F				
	SUMMER OCC	°F		UNOCC	°F				

ZONE NO.		FUNCTION:						
OCCUPANCY HOURS:	M-F		TO		SAT		TO	
	SUN		TO					
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F			
	SUMMER OCC	°F		UNOCC	°F			

ZONE NO.		FUNCTION:							
OCCUPANCY HOURS:		M—F		TO		SAT		TO	
		SUN		TO					
PRESENT TEMP	WINTER OCC		°F		UNOCC	°F			
	SUMMER OCC		°F		UNOCC	°F			

REMARKS:

LOCATION: FT. LEONARD WOOD BLDG: 2250

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: **AJN**

CHECKED BY: CEL

FILE: 2250AH1

AIR HANDLING UNIT SURVEY OBSERVATIONS

AHU-1	AHU NO.	MECH. ROOM	LOCATION (RM)
BLR-1	REF. SYS. SERVING AHU	WORK BAY	SERVES AREA

UNIT TYPE:

X	SINGLE ZN		2-PIPE FC		4-PIPE FC		UNIT HTR		H&V
	MULTIZONE		DOUBLE DT		REHEAT		INDUCTION		VAV
	NUMBER OF ZONES				OTHER				
	COMMENT:								

NAMEPLATE:

NO NAME PLATE					MFG.					MODEL
1.0	SUPPLY FAN HP				MFG.					MODEL
	RET/EXH FAN HP				MFG.					MODEL
1680	CFM – HTG	0	CFM – CLG	64%	MIN %OA	100%	MAX %OA	53%	% HTG AREA SERVED	

COMMENT:

COILS:

X	NONE		STM		HW		ELEC		MOD VLV	PREHEAT
	NONE		STM	X	HW		ELEC		MOD VLV	HEATING
X	NONE		STM		HW		ELEC		MOD VLV	REHEAT
X	NONE		STM		HW		ELEC		MOD VLV	HUMID.
X	NONE		DX		CW				MOD VLV	COOLING

OPERATION:

HOURS ON:		S	M	T	W	T	F	S	COMMENTS		
PRESENT START TIME		0	0	0	0	0	0	0	TIMECLOCK?		
PRESENT STOP TIME		2400	2400	2400	2400	2400	2400	2400	NO		
REQUIRED START TIME		0	700	700	700	700	700	0			
REQUIRED STOP TIME		0	1600	1600	1600	1600	1600	0			
MONTHS ON:		0									
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	0	0	0	0	0	1	1	1

CONTROLS:

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	N	MAX OA (Y/N)	N	RA (Y/N)	N	EA (Y/N)	
		MA CONTROL		ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:	N	(Y/N)							

COMMENTS:

FILE: 2250FC1

		PNEUMATIC	X	ELECTRIC	ELEC'NIC	DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT	SETBACK		
SPACE SETPOINT (°F):		OCC HEAT		UNOCC HEAT	OCC COOL	UNOCC COOL	
OTHER SETPOINTS (°F):		HOT DECK		COLD DECK	MIXED AIR	OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	N	MAX OA (Y/N)	RA (Y/N)	EA (Y/N)	
		MA CONTROL		ECONO - DB	ECONO - ENT	OTHER	
DEMAND LIMIT:	N	(Y/N)					
COMMENTS:							

		PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
RADIATION CONTROL	X	NONE		2-WAY VLV		3-WAY VLV		OTHER	
SPACE SETPOINT (°F):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
RESET CONTROL (°F):		HW HIGH		HW LOW		OA LOW		OA HIGH	
COMMENTS:									

FILE: 2250BLR

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
SETPOINTS		PSIG		HW SUPPLY					
RESET CONTROL (oF)	N	HW HIGH	N	HW LOW	N	OA LOW	N	OA HIGH	
BURNER CONTROLS		O2 TRIM (Y/N)		OTHER					
COMMENTS:									

FIELD SURVEY NOTES

BUILDING 2273

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD

BLDG: 2273

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 2273BLG

VI. BUILDING DATA SURVEY OBSERVATIONS

BLDG NO: 2273 BLDG NAME: ENTOMOLOGY

ZONE NO.	1	FUNCTION:INSECT CONTROL							
OCCUPANCY HOURS:	M-F	700	TO	1600	SAT	0	TO	0	
	SUN	0	TO	0					
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F				
	SUMMER OCC	°F		UNOCC	°F				

ZONE NO.		FUNCTION:							
OCCUPANCY HOURS:		M—F		TO		SAT		TO	
		SUN		TO					
PRESENT TEMP	WINTER OCC		°F		UNOCC	°F			
	SUMMER OCC		°F		UNOCC	°F			

ZONE NO.		FUNCTION:							
OCCUPANCY HOURS:		M—F		TO		SAT		TO	
		SUN		TO					
PRESENT TEMP	WINTER OCC		°F		UNOCC	°F			
	SUMMER OCC		°F		UNOCC	°F			

REMARKS:

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 2273

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 2273AH1

AIR HANDLING UNIT SURVEY OBSERVATIONS

AHU-1	AHU NO.	MECH. ROOM	LOCATION (RM)
DX-1	REF. SYS. SERVING AHU	ADMINISTRATION OFFICES	SERVES AREA

UNIT TYPE:

X	SINGLE ZN	2-PIPE FC	4-PIPE FC	UNIT HTR	H&V
	MULTIZONE	DOUBLE DT	REHEAT	INDUCTION	VAV
	NUMBER OF ZONES	OTHER			
	COMMENT:				

NAMEPLATE:

NO NAME PLATE	MFG.	MODEL
0.8 SUPPLY FAN HP	NO NAME PLATE	MFG.
RET/EXH FAN HP	MFG.	MODEL
1800 CFM-HTG	1800 CFM-CLG	10% MIN %OA
100% MAX %OA	40% % HTG AREA SERVED	
COMMENT:		

COILS:

X	NONE	STM	HW	ELEC	MOD VLV	PREHEAT
	NONE	X STM	HW	ELEC	MOD VLV	HEATING
X	NONE	STM	HW	ELEC	MOD VLV	REHEAT
X	NONE	STM	HW	ELEC	MOD VLV	HUMID.
	NONE	X DX	CW		MOD VLV	COOLING

OPERATION:

HOURS ON:		S	M	T	W	T	F	S	COMMENTS		
PRESENT START TIME		0	0	0	0	0	0	0	TIMECLOCK?		
PRESENT STOP TIME		2400	2400	2400	2400	2400	2400	2400	NO		
REQUIRED START TIME		0	700	700	700	700	700	0			
REQUIRED STOP TIME		0	1600	1600	1600	1600	1600	0			
MONTHS ON:		0									
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	1	1	1	1	1	1	1	1

CONTROLS:

	PNEUMATIC	X	ELECTRIC	ELEC'NIC	DDC	COMMENTS
THERMOSTAT TYPE:	SINGLE STPT		DUAL SETPNT	SETBACK		
SPACE SETPOINT (oF):	OCC HEAT		UNOCC HEAT	OCC COOL	UNOCC COOL	
OTHER SETPOINTS (oF):	HOT DECK		COLD DECK	MIXED AIR	OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	N	MAX OA (Y/N)	N	EA (Y/N)
	MA CONTROL		ECONO-DB	ECONO-ENT	OTHER	
DEMAND LIMIT:	Y	(Y/N)				
COMMENTS:						

LOCATION: FT. LEONARD WOOD BLDG: 2273

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: **AJN**

CHECKED BY: CEL

FILE: 2273CH1

REFRIGERATION EQUIPMENT SURVEY OBSERVATIONS

DX-1	CHILLER/COMPRESSOR NO.	OUTSIDE BLDG	LOCATION (RM)

UNIT TYPE:

	CENTRIFUGAL WITH WATER SIDE COOLING TOWER						OTHER
	RECIPROCATING WITH WATER SIDE COOLING TOWER					X	AHU'S SERVED AHU-1
	RECIPROCATING WITH AIR COOLED CONDENSING UNIT						
	ABSORPTION WITH WATER SIDE COOLING TOWER						
X	AIR COOLED CONDENSING UNIT						
	CHW	X	DX		OTHER		

NAMEPLATE:

CHILLER		MFG.	NO NAME PLATE			MODEL				SERIAL NO.
	VOLTS		MCA		PH		HZ	4.5	CAPACITY (TONS)	
CONDENSER FANS		MFG.				MODEL				# OF FANS
	VOLTS		AMPS		PH		HZ		HP	
DTW PUMP		MFG.				MODEL				SERIAL NO.
	VOLTS		AMPS		PH		HZ		HP	
CNW PUMP		MFG.				MODEL				SERIAL NO.
	VOLTS		AMPS		PH		HZ		HP	

COMMENTS:

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENT
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	
REQUIRED START TIME	0	700	700	700	700	700	0	
REQUIRED STOP TIME	0	1600	1600	1600	1600	1600	0	

MONTHS ON:

J	F	M	A	M	J	J	A	S	O	N	D
0	0	0	0	1	1	1	1	1	0	0	0

CONTROLS:

	PNEUMATIC	X	ELECTRIC	ELEC'NIC	DDC	COMMENTS
SETPOINTS	CWS (oF)		CWR (oF)	CNWS (oF)	CNWR (oF)	
PANEL INDICATORS						
- PRESSURE	LITE-HI		LITE-LOW	GAUGES		
- TEMPERATURE	LITE-HI		LITE-LOW	GAUGES		
- OTHER						

COMMENTS:

FILE: 2273HV1

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	N	RA (Y/N)	N	EA (Y/N)	
		MA CONTROL		ECONO – DB		ECONO – ENT		OTHER	
DEMAND LIMIT:	N	(Y/N)							
COMMENTS:									

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 2273

EMC NO.: #3204.000

DATE: Mar-93

PREPARED BY: **AJN**

CHECKED BY: CEL

FILE: **2273BLR**

BOILER & CONVERTER SURVEY OBSERVATIONS

BLR-1	BOILER/CONVERTER NO.	MECH. RM.	LOCATION (RM)
	SOURCE OF HEATING (PLANT)	ALL	SERVES AREA

UNIT TYPE:

X	STEAM		PSIG		HW		TEMP.		BOILER TYPE:
X	NO.2 OIL		NO.6 OIL		N.GAS		ELEC		FUELS:
	STM/HW		HTHW/HW		HTHW/STM		OTHER		CONVERTER TYPE:
X	SPACE HEAT		DHW		OTHER				USE:
COMMENT:							0.0%	% HTG AREA SERVED	
								BB RADIATION ONLY	

NAMEPLATE:

NO NAME PLATE		MFG.		MODEL	300000	CAPACITY OUTPUT (BTUH)
					300000	CAPACITY INPUT (BTUH)
		MFG.		MODEL		CAPACITY OUTPUT (BTUH)
						CAPACITY INPUT (BTUH)
	HW PUMP 1 – HP			MFG.		MODEL
	HW PUMP 2 – HP			MFG.		MODEL
0.33	COND PUMP 1 – HP			MFG.		MODEL
COMMENT:						

OPERATION:

HOURS ON:		S	M	T	W	T	F	S	COMMENT		
PRESENT START TIME		0	0	0	0	0	0	0	TIMECLOCK?		
PRESENT STOP TIME		2400	2400	2400	2400	2400	2400	2400			
REQUIRED START TIME		0	700	700	700	700	700	0			
REQUIRED STOP TIME		0	1600	1600	1600	1600	1600	0			
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	0	0	0	0	0	1	1	1

CONTROLS:

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
SETPOINTS		PSIG		HW SUPPLY					
RESET CONTROL (oF)	N	HW HIGH	N	HW LOW	N	OA LOW	N	OA HIGH	
BURNER CONTROLS		O2 TRIM (Y/N)		OTHER					
COMMENTS:									

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 2273

EMC NO.: #3204.000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 2273DHW1

DOMESTIC HW SURVEY OBSERVATIONS

DHW-1	BOILER/CONVERTER NO.	MECH RM	LOCATION (RM)
ELEC.	SOURCE OF HEATING (PLANT)	ALL	SERVES AREA

UNIT TYPE:

NO.2 OIL	NO.6 OIL	N.GAS	X	ELEC	FUELS:
STM/HW	HTHW/HW	HTHW/STM		OTHER	CONVERTER TYPE:

COMMENT:

NAMEPLATE:

IMPERIAL	MFG.	81G-52D	MODEL	4500	CAPACITY OUTPUT (WATTS)
	MFG.		MODEL		CAPACITY OUTPUT (BTUH)

DOMESTIC HW CIRCULATION PUMP: NONE

HW PUMP 1 - HP	MFG.	MODEL
HW PUMP 2 - HP	MFG.	MODEL
HW PUMP 3 - HP	MFG.	MODEL

COMMENT:

DIMENSION:	36	DIAMETER (INCHES)	60	HEIGHT OR LENGTH (INCHES)	40	GALLON
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OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENT
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	NO
REQUIRED START TIME	0	700	700	700	700	700	0	
REQUIRED STOP TIME	0	1600	1600	1600	1600	1600	0	

MONTHS ON:

J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	1	1	1	1	1	1	1	1

CONTROLS:

	PNEUMATIC	X	ELECTRIC	ELEC'NIC	DDC	COMMENTS
SETPOINTS			HW SUPPLY			

COMMENTS:

FIELD SURVEY NOTES

BUILDING 2399

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD

BLDG: 2399

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 2399BLG

VI. BUILDING DATA SURVEY OBSERVATIONS

BLDG NO: 2399 BLDG NAME: VET CLINIC

ZONE NO.	1	FUNCTION: ANIMAL CARE						
OCCUPANCY HOURS:	M-F	800	TO	1600	SAT	0	TO	0
	SUN	0	TO	0				
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F			
	SUMMER OCC	°F		UNOCC	°F			

ZONE NO.	FUNCTION:							
OCCUPANCY HOURS:	M-F		TO		SAT		TO	
	SUN		TO					
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F			
	SUMMER OCC	°F		UNOCC	°F			

ZONE NO.	FUNCTION:							
OCCUPANCY HOURS:	M-F		TO		SAT		TO	
	SUN		TO					
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F			
	SUMMER OCC	°F		UNOCC	°F			

REMARKS:

FILE: 2399AH1

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			PNEUMATIC
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	ACTUATORS
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	N	MAX OA (Y/N)	N	RA (Y/N)	N	EA (Y/N)	
		MA CONTROL		ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:	Y	YES		NO					
COMMENTS:									

COMMENTS:

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
SETPOINTS		PSIG		HW SUPPLY					
RESET CONTROL (oF)	N	HW HIGH	N	HW LOW	N	OA LOW	N	OA HIGH	
BURNER CONTROLS	N	O2 TRIM (Y/N)		OTHER					
COMMENTS: OIL FIRED									

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 2399

EMC NO.: #3204.000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 2399DHW1

DOMESTIC HW SURVEY OBSERVATIONS

DHW-1	BOILER/CONVERTER NO.	MECH RM	LOCATION (RM)
ELEC.	SOURCE OF HEATING (PLANT)	ALL	SERVES AREA

UNIT TYPE:

NO.2 OIL	NO.6 OIL	X	N.GAS	X	ELEC	FUELS:
STM/HW	HTHW/HW		HTHW/STM		OTHER	CONVERTER TYPE:

COMMENT:

NAMEPLATE:

RUUD	MFG.	RPL75	MODEL	20210	CAPACITY OUTPUT (WATTS)
	MFG.		MODEL		CAPACITY OUTPUT (BTUH)

DOMESTIC HW CIRCULATION PUMP: YES

0.1	HW PUMP 1 - HP	ARMSTRONG	MFG.		MODEL
	HW PUMP 2 - HP		MFG.		MODEL
	HW PUMP 3 - HP		MFG.		MODEL

COMMENT:

DIMENSION:	24	DIAMETER (INCHES)	60	HEIGHT OR LENGTH (INCHES)	100 GALLON
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OPERATION:

HOURS ON:		S	M	T	W	T	F	S	COMMENT		
PRESENT START TIME		0	0	0	0	0	0	0	TIMECLOCK?		
PRESENT STOP TIME		2400	2400	2400	2400	2400	2400	2400	NO		
REQUIRED START TIME		0	800	800	800	800	800	0			
REQUIRED STOP TIME		0	1600	1600	1600	1600	1600	0			
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	1	1	1	1	1	1	1	1

CONTROLS:

	PNEUMATIC	X	ELECTRIC	ELEC'NIC	DDC	COMMENTS
SETPOINTS			HW SUPPLY			
COMMENTS:						

FIELD SURVEY NOTES

BUILDING 2574

FIELD SURVEY NOTES

TO: FILE, FT. LEONARD WOOD
FR: CARL LUNDSTROM
DT: 16 NOVEMBER 1992

RE: BLDG 2574, PROPANE GAS PLANT

- Harbert, the fort maintenance contractor operators the propane gas plant.
- The plant is operated one shift, 5 days a week.
- The operators thought it would be very good to have it remotely monitored.
- The monitoring could include such items as:
 - Fire alarm
 - Fire suppression status
 - Propane temperature out of the 9 vaporizers
 - Monitor controlling regulator for inlet pressure and outlet pressure
- The fort is currently adding natural gas. They don't know how the plant will be used after the gas is added.

FIELD SURVEY NOTES

BUILDING 3210

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD

BLDG: 3210

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: CEL

CHECKED BY: CEL

FILE: 3210BLG

VI. BUILDING DATA SURVEY OBSERVATIONS

BLDG NO: 3210 BLDG NAME: DAYROOM

ZONE NO.	1	FUNCTION:					
OCCUPANCY HOURS:		M-F	TO	SAT	TO		
		SUN	TO				
PRESENT TEMP	WINTER OCC		°F	UNOCC	°F		
	SUMMER OCC		°F	UNOCC	°F		

ZONE NO.		FUNCTION:					
OCCUPANCY HOURS:		M-F	TO	SAT	TO		
		SUN	TO				
PRESENT TEMP	WINTER OCC		°F	UNOCC	°F		
	SUMMER OCC		°F	UNOCC	°F		

ZONE NO.		FUNCTION:					
OCCUPANCY HOURS:		M-F	TO	SAT	TO		
		SUN	TO				
PRESENT TEMP	WINTER OCC		°F	UNOCC	°F		
	SUMMER OCC		°F	UNOCC	°F		

REMARKS: A. SEE SYSTEM SCHEDULES FOR OCCUPANCY

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 3210

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: kc

CHECKED BY: CEL

FILE: 3210FC1

AIR HANDLING UNIT SURVEY OBSERVATIONS

FC-1	AHU NO.	CEILING	LOCATION (RM)
C.PLANT	REF. SYS. SERVING AHU	NORTH	SERVES AREA

UNIT TYPE:

SINGLE ZN	X	2-PIPE FC	4-PIPE FC	UNIT HTR	H&V
MULTIZONE		DOUBLE DT	REHEAT	INDUCTION	VAV
NUMBER OF ZONES		OTHER			
COMMENT:					

NAMEPLATE:

NA					MFG.	NA				MODEL
2.0	SUPPLY FAN HP				MFG.					MODEL
	RET/EXH FAN HP				MFG.					MODEL
1200	CFM – HTG	1200	CFM – CLG	50%	MIN %OA	100%	MAX %OA	50%	% HTG AREA SERVED	

COMMENT:

COILS:

X	NONE		STM		HW		ELEC		MOD VLV	PREHEAT
	NONE		STM	X	HW		ELEC	X	MOD VLV	HEATING
X	NONE		STM		HW		ELEC		MOD VLV	REHEAT
X	NONE		STM		HW		ELEC		MOD VLV	HUMID.
	NONE		DX	X	CW			X	MOD VLV	COOLING

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENTS
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	N
REQUIRED START TIME	0	1700	1700	1700	1700	1700	1700	
REQUIRED STOP TIME	0	2200	2200	2200	2200	2400	2400	

MONTHS ON:

J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	1	1	1	1	1	1	1	1

CONTROLS:

	PNEUMATIC	X	ELECTRIC	ELEC'NIC	DDC	COMMENTS
THERMOSTAT TYPE:	SINGLE STPT		DUAL SETPNT	SETBACK		
SPACE SETPOINT (oF):	OCC HEAT		UNOCC HEAT	OCC COOL	UNOCC COOL	
OTHER SETPOINTS (oF):	HOT DECK		COLD DECK	MIXED AIR	OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	RA (Y/N)	EA (Y/N)
		MA CONTROL		ECONO-DB	ECONO-ENT	OTHER
DEMAND LIMIT:	Y	YES	NO			
COMMENTS:						

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 3210

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: kc

CHECKED BY: CEL

FILE: 3210FC2

AIR HANDLING UNIT SURVEY OBSERVATIONS

FC-2	AHU NO.	CEILING	LOCATION (RM)
C.PLANT	REF. SYS. SERVING AHU	SOUTH	SERVES AREA

UNIT TYPE:

SINGLE ZN	X	2-PIPE FC	4-PIPE FC	UNIT HTR	H&V
MULTIZONE		DOUBLE DT	REHEAT	INDUCTION	VAV
NUMBER OF ZONES		OTHER			
COMMENT:					

NAMEPLATE:

NA					MFG.	NA				MODEL
2.0	SUPPLY FAN HP				MFG.					MODEL
	RET/EXH FAN HP				MFG.					MODEL
1200	CFM-HTG	1200	CFM-CLG	50%	MIN %OA	100%	MAX %OA	50%	% HTG AREA SERVED	
COMMENT:										

COILS:

X	NONE		STM		HW		ELEC		MOD VLV	PREHEAT
	NONE		STM	X	HW		ELEC	X	MOD VLV	HEATING
X	NONE		STM		HW		ELEC		MOD VLV	REHEAT
X	NONE		STM		HW		ELEC		MOD VLV	HUMID.
	NONE		DX	X	CW			X	MOD VLV	COOLING

OPERATION:

HOURS ON:		S	M	T	W	T	F	S	COMMENTS		
PRESENT START TIME		0	0	0	0	0	0	0	TIMECLOCK?		
PRESENT STOP TIME		2400	2400	2400	2400	2400	2400	2400	N		
REQUIRED START TIME		0	1700	1700	1700	1700	1700	1700			
REQUIRED STOP TIME		0	2200	2200	2200	2200	2400	2400			
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	1	1	1	1	1	1	1	1

CONTROLS:

	PNEUMATIC	X	ELECTRIC	ELEC'NIC	DDC	COMMENTS
THERMOSTAT TYPE:	SINGLE STPT		DUAL SETPNT	SETBACK		
SPACE SETPOINT (oF):	OCC HEAT		UNOCC HEAT	OCC COOL	UNOCC COOL	
OTHER SETPOINTS (oF):	HOT DECK		COLD DECK	MIXED AIR	OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	RA (Y/N)	EA (Y/N)
	MA CONTROL		ECONO-DB	ECONO-ENT	OTHER	
DEMAND LIMIT:	Y	YES	NO			
COMMENTS:						

FIELD SURVEY NOTES

3211 3212, 3213, 3214
BUILDING 3215

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD

BLDG: 3211

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: KC

CHECKED BY: CEL

FILE: 3211BLG

VI. BUILDING DATA SURVEY OBSERVATIONS

BLDG NO: 3211 BLDG NAME: VISITOR OFFICER QUARTERS

ZONE NO.	1	FUNCTION: QUARTERS						
OCCUPANCY HOURS:	M-F	0	TO	2400	SAT	0	TO	2400
	SUN	0	TO	2400				
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F			
	SUMMER OCC	°F		UNOCC	°F			

ZONE NO.		FUNCTION:						
OCCUPANCY HOURS:	M-F		TO		SAT		TO	
	SUN		TO					
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F			
	SUMMER OCC	°F		UNOCC	°F			

ZONE NO.		FUNCTION:							
OCCUPANCY HOURS:		M—F		TO		SAT		TO	
		SUN		TO					
PRESENT TEMP	WINTER OCC		°F		UNOCC	°F			
	SUMMER OCC		°F		UNOCC	°F			

REMARKS:

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	N	MAX OA (Y/N)	N	RA (Y/N)	N	EA (Y/N)	
		MA CONTROL		ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:	Y	YES		NO					
COMMENTS:									

CONTROLS:									
		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	N	MAX OA (Y/N)	N	RA (Y/N)	N	EA (Y/N)	
		MA CONTROL		ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:	Y	YES		NO					
COMMENTS:									

FILE: 3211FC3

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	N	MAX OA (Y/N)	N	RA (Y/N)	N	EA (Y/N)	
		MA CONTROL		ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:	Y	YES		NO					
COMMENTS:									

CONTROLS:

FIELD SURVEY NOTES

BUILDING 4052

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD

BLDG: 4052

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 4052BLG

VI. BUILDING DATA SURVEY OBSERVATIONS

BLDG NO: 4052 BLDG NAME: ADMINISTRATION

ZONE NO.	1	FUNCTION: ADMINISTRATION						
OCCUPANCY HOURS:	M – F	800	TO	1600	SAT	0	TO	0
	SUN	0	TO	0				
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F			
	SUMMER OCC	°F		UNOCC	°F			

ZONE NO.		FUNCTION:							
OCCUPANCY HOURS:		M—F		TO		SAT		TO	
		SUN		TO					
PRESENT TEMP	WINTER OCC		°F		UNOCC	°F			
	SUMMER OCC		°F		UNOCC	°F			

ZONE NO.		FUNCTION:							
OCCUPANCY HOURS:		M—F		TO		SAT		TO	
		SUN		TO					
PRESENT TEMP	WINTER OCC		°F		UNOCC	°F			
	SUMMER OCC		°F		UNOCC	°F			

REMARKS:

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 4052

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 4052AH1

AIR HANDLING UNIT SURVEY OBSERVATIONS

AHU-1	AHU NO.	MECH. ROOM	LOCATION (RM)
ACCU-1	REF. SYS. SERVING AHU	ALL	SERVES AREA

UNIT TYPE:

X	SINGLE ZN	2-PIPE FC	4-PIPE FC	UNIT HTR	H&V
	MULTIZONE	DOUBLE DT	REHEAT	INDUCTION	VAV
	NUMBER OF ZONES	OTHER			
	COMMENT:				

NAMEPLATE:

NO NAME PLATE	MFG.	MODEL
0.3 SUPPLY FAN HP	MFG.	MODEL
RET/EXH FAN HP	MFG.	MODEL
1000 CFM-HTG 1000 CFM-CLG 0% MIN %OA 0% MAX %OA 100% % HTG AREA SERVED		
COMMENT:		

COILS:

X	NONE	STM	HW	ELEC	MOD VLV	PREHEAT
	NONE	STM	HW	X	MOD VLV	HEATING
X	NONE	STM	HW	ELEC	MOD VLV	REHEAT
X	NONE	STM	HW	ELEC	MOD VLV	HUMID.
	NONE	X	DX	CW	MOD VLV	COOLING

OPERATION:

HOURS ON:		S	M	T	W	T	F	S	COMMENTS		
PRESENT START TIME		0	0	0	0	0	0	0	TIMECLOCK?		
PRESENT STOP TIME		2400	2400	2400	2400	2400	2400	2400	NO		
REQUIRED START TIME		0	800	800	800	800	800	0			
REQUIRED STOP TIME		0	1600	1600	1600	1600	1600	0			
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	1	1	1	1	1	1	1	1

CONTROLS:

	PNEUMATIC	X	ELECTRIC	ELEC'NIC	DDC	COMMENTS
THERMOSTAT TYPE:	SINGLE STPT	DUAL SETPNT	SETBACK			
SPACE SETPOINT (oF):	OCC HEAT	UNOCC HEAT	OCC COOL	UNOCC COOL		
OTHER SETPOINTS (oF):	HOT DECK	COLD DECK	MIXED AIR	OTHER		
DAMPER CONTROL:	N	MIN OA (Y/N)	N	MAX OA (Y/N)	RA (Y/N)	EA (Y/N)
	MA CONTROL	ECONO-DB	ECONO-ENT	OTHER		
DEMAND LIMIT:	Y	YES	NO			
COMMENTS:						

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 4052

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 4052CH1

REFRIGERATION EQUIPMENT SURVEY OBSERVATIONS

ACCU-1	CHILLER/COMPRESSOR NO.	OUTSIDE BLDG	LOCATION (RM)

UNIT TYPE:

	CENTRIFUGAL WITH WATER SIDE COOLING TOWER		OTHER
	RECIPROCATING WITH WATER SIDE COOLING TOWER	X	AHU'S SERVED AHU-1
	RECIPROCATING WITH AIR COOLED CONDENSING UNIT		
	ABSORPTION WITH WATER SIDE COOLING TOWER		
X	AIR COOLED CONDENSING UNIT		
	CHW	X	DX
			OTHER

NAMEPLATE:

CHILLER		AIRTEMP	MFG.	12930HQ10			MODEL				SERIAL NO.	
230	VOLTS			MCA	1	PH	60	HZ	25.9	CAPACITY (TONS)		
CONDENSER FANS			MFG.				MODEL				1	# OF FANS
	VOLTS			AMPS		PH		HZ	1.5	HP		
DTW PUMP			MFG.				MODEL				SERIAL NO.	
	VOLTS			AMPS		PH		HZ		HP		
CNW PUMP			MFG.				MODEL				SERIAL NO.	
	VOLTS			AMPS		PH		HZ		HP		
COMMENTS:												

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENT			
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?			
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400				
REQUIRED START TIME	0	800	800	800	800	800	0				
REQUIRED STOP TIME	0	1600	1600	1600	1600	1600	0				
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
0	0	0	0	1	1	1	1	1	0	0	0

CONTROLS:

	PNEUMATIC	X	ELECTRIC	ELEC'NIC	DDC	COMMENTS
SETPOINTS	CWS (oF)		CWR (oF)	CNWS (oF)	CNWR (oF)	
PANEL INDICATORS						
- PRESSURE	LITE-HI		LITE-LOW	GAUGES		
- TEMPERATURE	LITE-HI		LITE-LOW	GAUGES		
- OTHER						

COMMENTS:

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 4052

EMC NO.: #3204.000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 4052DHW1

DOMESTIC HW SURVEY OBSERVATIONS

DHW-1	BOILER/CONVERTER NO.	MECH RM	LOCATION (RM)
ELEC.	SOURCE OF HEATING (PLANT)	ALL	SERVES AREA

UNIT TYPE:

NO.2 OIL	NO.6 OIL	N.GAS	X	ELEC	FUELS:
STM/HW	HTHW/HW	HTHW/STM		OTHER	CONVERTER TYPE:

COMMENT:

NAMEPLATE:

PACEMAKER	MFG.	RP20P40-1	MODEL	1500	CAPACITY OUTPUT (WATTS)
	MFG.		MODEL		CAPACITY OUTPUT (BTUH)

DOMESTIC HW CIRCULATION PUMP: NONE

HW PUMP 1 - HP	MFG.	MODEL
HW PUMP 2 - HP	MFG.	MODEL
HW PUMP 3 - HP	MFG.	MODEL

COMMENT:

DIMENSION:	20	DIAMETER (INCHES)	24	HEIGHT OR LENGTH (INCHES)	20 GALLON
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OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENT
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	NO
REQUIRED START TIME	0	800	800	800	800	800	0	
REQUIRED STOP TIME	0	1600	1600	1600	1600	1600	0	

MONTHS ON:

J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	1	1	1	1	1	1	1	1

CONTROLS:

	PNEUMATIC	X	ELECTRIC	ELEC'NIC	DDC	COMMENTS
SETPOINTS			HW SUPPLY			

COMMENTS:

FIELD SURVEY NOTES

BUILDING 4100 & 4101

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD

BLDG: 4100

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 4100BLG

VI. BUILDING DATA SURVEY OBSERVATIONS

BLDG NO: 4100

BLDG NAME: BEQ

ZONE NO.	1	FUNCTION: QUARTERS							
OCCUPANCY HOURS:	M—F	0	TO	2400	SAT	0	TO	2400	
	SUN	0	TO	2400					
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F				
	SUMMER OCC	°F		UNOCC	°F				

ZONE NO.		FUNCTION:							
OCCUPANCY HOURS:		M—F		TO		SAT		TO	
		SUN		TO					
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F				
	SUMMER OCC	°F		UNOCC	°F				

ZONE NO.		FUNCTION:							
OCCUPANCY HOURS:		M—F		TO		SAT		TO	
		SUN		TO					
PRESENT TEMP	WINTER OCC		°F		UNOCC	°F			
	SUMMER OCC		°F		UNOCC	°F			

REMARKS:

FILE: 4100RAD1

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
RADIATION CONTROL:		NONE		2-WAY VLV		3-WAY VLV		OTHER	
SPACE SETPOINT (°F):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
RESET CONTROL (°F):		HW HIGH		HW LOW		OA LOW		OA HIGH	
COMMENTS:									

CONTROLS:									
		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
RADIATION CONTROL:		NONE		2-WAY VLV		3-WAY VLV		OTHER	
SPACE SETPOINT (°F):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
RESET CONTROL (°F):		HW HIGH		HW LOW		OA LOW		OA HIGH	
COMMENTS:									

FILE: 4100BLR

SERVES AREA

BB RADIATION ONLY

COMMENT: PUMPS, SEE HW RAD SYSTEMS

1

COMMENTS:

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
SETPOINTS				HW SUPPLY					
COMMENTS:									

FIELD SURVEY NOTES

BUILDING 4102 & 4104
SAME AS 4100

FIELD SURVEY NOTES

BUILDING 4103
SAME AS 4100

FIELD SURVEY NOTES

BUILDING 4109

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD

BLDG: 4109

EMC NO.: #3204-000

DATE: Apr-93

PREPARED BY: KC

CHECKED BY: CEL

FILE: 4109BLG

VI. BUILDING DATA SURVEY OBSERVATIONS

BLDG NO: 4109 BLDG NAME: OFFICERS OPEN MESS

ZONE NO.	1	FUNCTION:DINING						
OCCUPANCY HOURS:	M-F	VARIES	TO	0	SAT	0	TO	0
	SUN	0	TO	0				
PRESENT TEMP	WINTER OCC	70.0 °F		UNOCC	°F			
	SUMMER OCC	°F		UNOCC	°F			

ZONE NO.		2		FUNCTION: OFFICES													
OCCUPANCY HOURS:		M-F		700		TO		2200		SAT				TO			
		SUN				TO											
PRESENT TEMP		WINTER OCC		70.0 °F				UNOCC		°F							
		SUMMER OCC		°F				UNOCC		°F							

ZONE NO.		FUNCTION:							
OCCUPANCY HOURS:		M-F		TO		SAT		TO	
		SUN		TO					
PRESENT TEMP	WINTER OCC		°F		UNOCC	°F			
	SUMMER OCC		°F		UNOCC	°F			

REMARKS:

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 4109

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 4109AC1

AIR HANDLING UNIT SURVEY OBSERVATIONS

ACU-1	AHU NO.	RM 115	LOCATION (RM)
CH-1	REF. SYS. SERVING AHU	OFFICES	SERVES AREA

UNIT TYPE:

X	SINGLE ZN	2-PIPE FC	X	4-PIPE FC	UNIT HTR	H&V
	MULTIZONE	DOUBLE DT		REHEAT	INDUCTION	VAV
	NUMBER OF ZONES	OTHER				
	COMMENT:					

NAMEPLATE:

					MFG.						MODEL
0.75	SUPPLY FAN HP		CENTURY		MFG.						MODEL
	RET/EXH FAN HP				MFG.						MODEL
2060	CFM – HTG	2060	CFM – CLG	20%	MIN %OA	100%	MAX %OA	8.0%	% HTG AREA SERVED		

COMMENT:

COILS:

X	NONE		STM		HW		ELEC		MOD VLV	PREHEAT
	NONE		STM	X	HW		ELEC	X	MOD VLV	HEATING
X	NONE		STM		HW		ELEC		MOD VLV	REHEAT
X	NONE		STM		HW		ELEC		MOD VLV	HUMID.
	NONE		DX	X	CW			X	MOD VLV	COOLING

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENTS
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	YES,
REQUIRED START TIME	0	700	700	700	700	700	0	NO PINS
REQUIRED STOP TIME	0	2200	2200	2200	2200	2200	0	

MONTHS ON:

J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	1	1	1	1	1	1	1	1

CONTROLS:

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)	N	EA (Y/N)	
	N	MA CONTROL	N	ECONO-DB	N	ECONO-ENT		OTHER	
DEMAND LIMIT:	Y	(Y / N)							

COMMENTS:

FILE: 4109AC2

CONTROLS									
		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)	N	EA (Y/N)	
	N	MA CONTROL	N	ECONO-DB	N	ECONO-ENT		OTHER	
DEMAND LIMIT:	Y	(Y / N)							
COMMENTS:									

FILE: 4109AC3

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)	N	EA (Y/N)	
	N	MA CONTROL	N	ECONO - DB	N	ECONO - ENT		OTHER	
DEMAND LIMIT:	Y	(Y / N)							
COMMENTS:									

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 4109

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 4109AC4

AIR HANDLING UNIT SURVEY OBSERVATIONS

ACU-4	AHU NO.	RM 102	LOCATION (RM)
CH-1	REF. SYS. SERVING AHU	BAR / LOUNGE	SERVES AREA

UNIT TYPE:

X	SINGLE ZN	2-PIPE FC	X	4-PIPE FC	UNIT HTR	H&V
	MULTIZONE	DOUBLE DT		REHEAT	INDUCTION	VAV
	NUMBER OF ZONES			OTHER		
	COMMENT:					

NAMEPLATE:

					MFG.						MODEL
0.75	SUPPLY FAN HP		CENTURY		MFG.						MODEL
	RET/EXH FAN HP				MFG.						MODEL
2760	CFM-HTG	2760	CFM-CLG	35%	MIN %OA	100%	MAX %OA	5.6%	% HTG AREA SERVED		
COMMENT:											

COILS:

X	NONE		STM		HW		ELEC		MOD VLV	PREHEAT
	NONE		STM	X	HW		ELEC	X	MOD VLV	HEATING
X	NONE		STM		HW		ELEC		MOD VLV	REHEAT
X	NONE		STM		HW		ELEC		MOD VLV	HUMID.
	NONE		DX	X	CW			X	MOD VLV	COOLING

OPERATION:

HOURS ON:		S	M	T	W	T	F	S	COMMENTS		
PRESENT START TIME		0	0	0	0	0	0	0	TIMECLOCK?		
PRESENT STOP TIME		2400	2400	2400	2400	2400	2400	2400	YES,		
REQUIRED START TIME		1200	1200	1200	1200	1200	1200	1200	NO PINS		
REQUIRED STOP TIME		2200	2200	2200	2200	2200	2200	2200			
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	1	1	1	1	1	1	1	1

CONTROLS:

	PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:	SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):	OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):	HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)	N	EA (Y/N)
	N	MA CONTROL	N	ECONO-DB	N	ECONO-ENT		OTHER
DEMAND LIMIT:	Y	(Y / N)						
COMMENTS:								

LOCATION: FT. LEONARD WOOD BLDG: 4109

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: **AJN**

CHECKED BY: CEL

FILE: 4109AH5

AIR HANDLING UNIT SURVEY OBSERVATIONS

AHU-5	AHU NO.	MECH. ROOM	LOCATION (RM)
CH-2	REF. SYS. SERVING AHU	BALL RM, KITCHEN, DINING	SERVES AREA

UNIT TYPE:

	SINGLE ZN		2-PIPE FC		4-PIPE FC		UNIT HTR		H&V
X	MULTIZONE		DOUBLE DT		REHEAT		INDUCTION		VAV
7	NUMBER OF ZONES				OTHER				
	COMMENT:	HONEYWELL ELECTRIC ACTUATORS							

NAMEPLATE:

CARRIER					MFG.					MODEL
10.00	SUPPLY FAN HP		CENTURY		MFG.	6-330772-1				MODEL
	RET/EXH FAN HP				MFG.					MODEL
20780	CFM-HTG	20780	CFM-CLG	45%	MIN %OA	100%	MAX %OA	68.0%	% HTG AREA SERVED	
COMMENT:										

COILS:

X	NONE		STM		HW		ELEC		MOD VLV	PREHEAT
	NONE		STM	X	HW		ELEC	X	MOD VLV	HEATING
X	NONE		STM		HW		ELEC		MOD VLV	REHEAT
X	NONE		STM		HW		ELEC		MOD VLV	HUMID.
	NONE		DX	X	CW			X	MOD VLV	COOLING

OPERATION:

[illegible]

CONTROLS:

CONTROLS									
		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)	N	EA (Y/N)	
	N	MA CONTROL	N	ECONO-DB	N	ECONO-ENT		OTHER	
DEMAND LIMIT:	Y	(Y / N)							
COMMENTS:									

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 4109

EMC NO.: #3204.000

DATE: Mar-93

PREPARED BY: **AJN**

CHECKED BY: CEL

FILE: 4109BLR

BOILER & CONVERTER SURVEY OBSERVATIONS

BLR-1	BOILER/CONVERTER NO.	MECH. RM.	LOCATION (RM)
	SOURCE OF HEATING (PLANT)	ALL	SERVES AREA

UNIT TYPE:

	STEAM		PSIG	X	HW		TEMP.		BOILER TYPE:
	NO.2 OIL		NO.6 OIL		N.GAS		ELEC		FUELS:
	STM/HW		HTHW/HW		HTHW/STM		OTHER		CONVERTER TYPE:
X	SPACE HEAT		DHW		OTHER				USE:
COMMENT:							0.0%	% HTG AREA SERVED	
								BB RADIATION ONLY	

NAMEPLATE:

PARKER		MFG.	0-1536	MODEL	1228800	CAPACITY OUTPUT (BTUH)
					1536000	CAPACITY INPUT (BTUH)
		MFG.		MODEL		CAPACITY OUTPUT (BTUH)
						CAPACITY INPUT (BTUH)
0.75	HW PUMP 1 – HP	TACO	MFG.	2506-5.5 A5B2A2TL2		MODEL
0.5	HW PUMP 2 – HP	TACO	MFG.			MODEL
0.5	HW PUMP 3 – HP	TACO	MFG.			MODEL
COMMENT: HW PUMP 1 IS PRIMARY; HW PUMP 2 IS SECONDARY SERVING ACUs 1-4;						
HW PUMP 3 IS SECONDARY SERVING AHU-5						

OPERATION:

HOURS ON:		S	M	T	W	T	F	S	COMMENT		
PRESENT START TIME		0	0	0	0	0	0	0	TIMECLOCK?		
PRESENT STOP TIME		2400	2400	2400	2400	2400	2400	2400	NO		
REQUIRED START TIME		600	600	600	600	600	600	600			
REQUIRED STOP TIME		2200	2200	2200	2200	2200	2200	2200			
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	0	0	0	0	0	1	1	1

CONTROLS:

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
SETPOINTS		PSIG	150	HW SUPPLY	165	HIGH LIMIT			
RESET CONTROL (oF)		HW HIGH		HW LOW		OA LOW		OA HIGH	
BURNER CONTROLS		O2 TRIM (Y/N)		OTHER					
COMMENTS:									

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 4109

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: **AJN**

CHECKED BY: CEL

FILE: 4109CH1

REFRIGERATION EQUIPMENT SURVEY OBSERVATIONS

CH-1	CHILLER/COMPRESSOR NO.	MECH. ROOM	LOCATION (RM)

UNIT TYPE:

	CENTRIFUGAL WITH WATER SIDE COOLING TOWER						OTHER	
	RECIPROCATING WITH WATER SIDE COOLING TOWER					X	AHU'S SERVED	ACU-1, ACU-2,
X	RECIPROCATING WITH AIR COOLED CONDENSING UNIT							ACU-3, ACU-4,
	ABSORPTION WITH WATER SIDE COOLING TOWER							
	AIR COOLED CONDENSING UNIT							
X	CHW		DX		OTHER			

NAMEPLATE:

CHILLER	CARRIER	MFG.	30H60-B160			MODEL	J322509			SERIAL NO
460	VOLTS	52	AMPS	3	PH	60	HZ	52	CAPACITY (TONS)	
CN FAN	CARRIER	MFG.	09AD044600			MODEL				3 # OF FANS
460	VOLTS	3	AMPS	3	PH	60	HZ	1.5	HP	
CW PUM	CENTURY	MFG.	6-32246A-01			MODEL				SERIAL NO
230	VOLTS	10	AMPS	3	PH	60	HZ	3	HP	
CW PUM	GE	MFG.				MODEL				SERIAL NO
230	VOLTS	2.8	AMPS	3	PH	60	HZ	0.75	HP	
COMMENTS: 1.5 HP CW PUMP IS THE PRIMARY; 0.75 HP PUMP IS SECONDARY SERVING ACUs 1-4										

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENT			
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?			
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400				
REQUIRED START TIME	0	700	700	700	700	700	0				
REQUIRED STOP TIME	0	2200	2200	2200	2200	2200	0				
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
0	0	0	0	1	1	1	1	1	0	0	0

CONTROLS:

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
SETPOINTS		CWS (oF)		CWR (oF)		CNWS (oF)		CNWR (oF)	
PANEL INDICATORS									
- PRESSURE		LITE - HI		LITE - LOW		GAUGES			
- TEMPERATURE		LITE - HI		LITE - LOW		GAUGES			
- OTHER									
COMMENTS:									

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
SETPOINTS		CWS (oF)		CWR (oF)		CNWS (oF)		CNWR (oF)	
PANEL INDICATORS									
– PRESSURE		LITE – HI		LITE – LOW		GAUGES			
– TEMPERATURE		LITE – HI		LITE – LOW		GAUGES			
– OTHER									
COMMENTS:									

FILE: 4109DHW1

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
SETPOINTS				HW SUPPLY					
COMMENTS:									

FIELD SURVEY NOTES

BUILDING 4110
AND TYPICAL FOR
4111, 4112, 4113, 4114, AND 4115
SAME AS 4100

FIELD SURVEY NOTES

BUILDING 5001

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD

BLDG: 5001

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 5001BLG

VI. BUILDING DATA SURVEY OBSERVATIONS

BLDG NO: 5001 BLDG NAME: AIRFIELD FIRE HOUSE

ZONE NO.	1	FUNCTION: QUARTERS / FIRE FIGHTING EQUIPMENT						
OCCUPANCY HOURS:	M—F	0	TO	2400	SAT	0	TO	2400
	SUN	0	TO	2400				
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F			
	SUMMER OCC	°F		UNOCC	°F			

ZONE NO.		FUNCTION:							
OCCUPANCY HOURS:		M—F		TO		SAT		TO	
		SUN		TO					
PRESENT TEMP	WINTER OCC		°F		UNOCC	°F			
	SUMMER OCC		°F		UNOCC	°F			

ZONE NO.		FUNCTION:							
OCCUPANCY HOURS:		M—F		TO		SAT		TO	
		SUN		TO					
PRESENT TEMP	WINTER OCC		°F		UNOCC	°F			
	SUMMER OCC		°F		UNOCC	°F			

REMARKS:

FILE: 5001FC1

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (°F):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (°F):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	N	MAX OA (Y/N)	N	RA (Y/N)	N	EA (Y/N)	
		MA CONTROL		ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:	N	(Y/N)							
COMMENTS:									

LOCATION: FT. LEONARD WOOD BLDG: 5001

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: **AJN**

CHECKED BY: CEL

FILE: 5001RAD1

PERIMETER RADIATION SURVEY OBSERVATIONS

RAD-1	PER RAD NO.	OFFICES AND QUARTERS	LOCATION (RM)
BLR-1	SOURCE OF HEATING	OFFICES AND QUARTERS	SERVES AREA

UNIT TYPE:

	STEAM	X	HW		ELECTRIC				
	OTHER								
	COMMENT:								

NAMEPLATE:

	HW PUMP 1 – HP		MFG.		MODEL
	HW PUMP 2 – HP		MFG.		MODEL
	HW PUMP 3 – HP		MFG.		MODEL
	HW PUMP 4 – HP		MFG.		MODEL
COMMENT:				57.0%	% AREA HEATING

OPERATION:

HOURS ON:		S	M	T	W	T	F	S	COMMENT		
PRESENT START TIME		0	0	0	0	0	0	0	TIMECLOCK?		
PRESENT STOP TIME		2400	2400	2400	2400	2400	2400	2400			
REQUIRED START TIME		0	0	0	0	0	0	0			
REQUIRED STOP TIME		2400	2400	2400	2400	2400	2400	2400			
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	0	0	0	0	0	1	1	1

CONTROLS:

		PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
RADIATION CONTROL	X	NONE		2-WAY VLV		3-WAY VLV		OTHER	
SPACE SETPOINT (°F):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
RESET CONTROL (°F):		HW HIGH		HW LOW		OA LOW		OA HIGH	
COMMENTS:									

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
SETPOINTS		PSIG	X	HW SUPPLY					
RESET CONTROL (oF)		HW HIGH		HW LOW		OA LOW		OA HIGH	
BURNER CONTROLS	N	O2 TRIM (Y/N)		OTHER					
COMMENTS:									

FILE: 5001DHW1

CONTROLS:									
		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
SETPOINTS				HW SUPPLY					
COMMENTS:									

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD

BLDG: 5001

Building UA: 3,035

System Type 20

System Name: FAN COIL

System Number: FC-1

EMC NO.: #3204-000

DATE: 15-Mar-93

PREPARED BY: BHS

CHECKED BY: CEL

FILE:

PAGE 1 OF 2

Typical Building Information

Category	Construction	Use	Occ.	Day
2	BRICK AND BLOCK	BARRACKS	0000-2400	S-S

Enter Weeks of Summer:

18

Enter Weeks of Winter:

26

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	PREVIOUS	INPUT
Motor HP	7.5	0.583
Load Factor	0.8	0.8
CFM - HTG	14235	1800
CFM - CLG	0	0
% OA	10.00%	0.00%
% Area	38.00%	43.00%
TON CAPC.	0	0
MBTU CAPC.	0	0
kW/Ton	0.915	0.915
MOSON	1	7
EFF	1	1
LOOK-UP VALUE		
EFFHP	65.00%	65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,024	3,024
Heating HRSON	4,368	4,368
C/H HRSON	8,760	8,760
Cooling HRSVA	0	
Heating HRSVA	0	
C/H HRSVA	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.17	0.17
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
NSC	21,000	21,000
DDCH	279,000	279,000
OPT	0	0
CHWF	13.90	13.90
CNWF	0.00	0.00
OAF	6.75	6.75

FIELD SURVEY NOTES

BUILDING 5002

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD

BLDG: 5002

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 5002BLG

VI. BUILDING DATA SURVEY OBSERVATIONS

BLDG NO: 5002 BLDG NAME: AIRLINE TERMINAL

ZONE NO.	1	FUNCTION: AIRLINE TERMINAL					
OCCUPANCY HOURS:	M-F	900	TO	1800	SAT	900	TO 1100
	SUN	1500	TO	1800			
PRESENT TEMP	WINTER OCC		°F	UNOCC		°F	
	SUMMER OCC		°F	UNOCC		°F	

ZONE NO.		FUNCTION:					
OCCUPANCY HOURS:	M-F		TO		SAT		TO
	SUN		TO				
PRESENT TEMP	WINTER OCC		°F	UNOCC		°F	
	SUMMER OCC		°F	UNOCC		°F	

ZONE NO.		FUNCTION:					
OCCUPANCY HOURS:	M-F		TO		SAT		TO
	SUN		TO				
PRESENT TEMP	WINTER OCC		°F	UNOCC		°F	
	SUMMER OCC		°F	UNOCC		°F	

REMARKS:

FILE: 5002AH1

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	N	MAX OA (Y/N)	N	RA (Y/N)	N	EA (Y/N)	
	N	MA CONTROL	N	ECONO - DB		ECONO - ENT		OTHER	
DEMAND LIMIT:	N	(Y/N)							
COMMENTS: BLDG IS LEASED TO TWA, NO INSULATION									

FILE: 5002AH2

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	N	MAX OA (Y/N)	N	RA (Y/N)	N	EA (Y/N)	
	N	MA CONTROL	N	ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:	N	(Y/N)							
COMMENTS: BLDG IS LEASED TO TWA, NO INSULATION									

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 5002

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 5002CH1

REFRIGERATION EQUIPMENT SURVEY OBSERVATIONS

ACCU-1	CHILLER/COMPRESSOR NO.	OUTSIDE BLDG	LOCATION (RM)

UNIT TYPE:

	CENTRIFUGAL WITH WATER SIDE COOLING TOWER		OTHER
	RECIPROCATING WITH WATER SIDE COOLING TOWER	X	AHU'S SERVED AHU-1
	RECIPROCATING WITH AIR COOLED CONDENSING UNIT		
	ABSORPTION WITH WATER SIDE COOLING TOWER		
X	AIR COOLED CONDENSING UNIT		
	CHW	X	DX
			OTHER

NAMEPLATE:

CHILLER	HEIL	MFG.	CA1060VKA2	MODEL	L890161953	SERIAL NO.
208	VOLTS	32.2	AMPS	1	PH	60
						5
						CAPACITY (TONS)
CONDENSER FANS	MFG.			MODEL		1
						# OF FANS
240	VOLTS	3.6	AMPS	1	PH	60
						0.33
						HP
DTW PUMP	MFG.			MODEL		SERIAL NO.
	VOLTS		AMPS		PH	
						HZ
						HP
CNW PUMP	MFG.			MODEL		SERIAL NO.
	VOLTS		AMPS		PH	
						HZ
						HP

COMMENTS:

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENT			
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?			
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	NO			
REQUIRED START TIME	1500	900	900	900	900	900	900				
REQUIRED STOP TIME	1800	1800	1800	1800	1800	1800	1100				
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
0	0	0	0	1	1	1	1	1	0	0	0

CONTROLS:

	PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
SETPOINTS	CWS (oF)		CWR (oF)		CNWS (oF)		CNWR (oF)	
PANEL INDICATORS								
- PRESSURE	LITE-HI		LITE-LOW		GAUGES			
- TEMPERATURE	LITE-HI		LITE-LOW		GAUGES			
- OTHER								
COMMENTS:								

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 5002

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 5002CH2

REFRIGERATION EQUIPMENT SURVEY OBSERVATIONS

ACCU-2	CHILLER/COMPRESSOR NO.	OUTSIDE BLDG	LOCATION (RM)

UNIT TYPE:

	CENTRIFUGAL WITH WATER SIDE COOLING TOWER		OTHER
	RECIPROCATING WITH WATER SIDE COOLING TOWER	X	AHU'S SERVED AHU-1
	RECIPROCATING WITH AIR COOLED CONDENSING UNIT		
	ABSORPTION WITH WATER SIDE COOLING TOWER		
X	AIR COOLED CONDENSING UNIT		
	CHW	X	DX
			OTHER

NAMEPLATE:

CHILLER	HEIL	MFG.	CA1060VKA2	MODEL	L890161953	SERIAL NO.
208	VOLTS	32.2	AMPS	1	PH	60 HZ
						5 CAPACITY (TONS)
CONDENSER FANS	MFG.			MODEL		1 # OF FANS
240	VOLTS	3.6	AMPS	1	PH	60 HZ
						0.33 HP
DTW PUMP	MFG.			MODEL		SERIAL NO.
	VOLTS		AMPS		PH	HZ
						HP
CNW PUMP	MFG.			MODEL		SERIAL NO.
	VOLTS		AMPS		PH	HZ
						HP

COMMENTS:

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENT			
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?			
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	NO			
REQUIRED START TIME	1500	900	900	900	900	900	900				
REQUIRED STOP TIME	1800	1800	1800	1800	1800	1800	1100				
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
0	0	0	0	1	1	1	1	1	0	0	0

CONTROLS:

	PNEUMATIC	X	ELECTRIC	ELEC'NIC	DDC	COMMENTS
SETPOINTS	CWS (oF)		CWR (oF)	CNWS (oF)	CNWR (oF)	
PANEL INDICATORS						
- PRESSURE	LITE-HI		LITE-LOW	GAUGES		
- TEMPERATURE	LITE-HI		LITE-LOW	GAUGES		
- OTHER						
COMMENTS:						

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 5002

EMC NO.: #3204.000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 5002DHW1

DOMESTIC HW SURVEY OBSERVATIONS

DHW-1	BOILER/CONVERTER NO.	MECH RM	LOCATION (RM)
ELEC.	SOURCE OF HEATING (PLANT)	ALL	SERVES AREA

UNIT TYPE:

NO.2 OIL	NO.6 OIL	N.GAS	X	ELEC	FUELS:
STM/HW	HTHW/HW	HTHW/STM		OTHER	CONVERTER TYPE:

COMMENT:

NAMEPLATE:

NO NAME PLATE	MFG.	MODEL	1500	CAPACITY OUTPUT (WATTS)
	MFG.	MODEL		CAPACITY OUTPUT (BTUH)

DOMESTIC HW CIRCULATION PUMP: NONE

HW PUMP 1 - HP	MFG.	MODEL
HW PUMP 2 - HP	MFG.	MODEL
HW PUMP 3 - HP	MFG.	MODEL

COMMENT:

DIMENSION:	12	DIAMETER (INCHES)	18	HEIGHT OR LENGTH (INCHES)	6	GALLON
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OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENT			
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?			
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	NO			
REQUIRED START TIME	1500	900	900	900	900	900	900				
REQUIRED STOP TIME	1800	1800	1800	1800	1800	1800	1100				
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	1	1	1	1	1	1	1	1

CONTROLS:

	PNEUMATIC	X	ELECTRIC	ELEC'NIC	DDC	COMMENTS
SETPOINTS			HW SUPPLY			

COMMENTS:

FIELD SURVEY NOTES

BUILDING 5004

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD

BLDG: 5004

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 5004BLG

VI. BUILDING DATA SURVEY OBSERVATIONS

BLDG NO: 5004 BLDG NAME: AIR FORCE OPS

ZONE NO.	1	FUNCTION: ADMINISTRATION					
OCCUPANCY HOURS:	M-F	600	TO	2100	SAT	1200	TO 2100
	SUN	700	TO	1500			
PRESENT TEMP	WINTER OCC		°F	UNOCC		°F	
	SUMMER OCC		°F	UNOCC		°F	

ZONE NO.		FUNCTION:					
OCCUPANCY HOURS:	M-F		TO		SAT		TO
	SUN		TO				
PRESENT TEMP	WINTER OCC		°F	UNOCC		°F	
	SUMMER OCC		°F	UNOCC		°F	

ZONE NO.		FUNCTION:					
OCCUPANCY HOURS:	M-F		TO		SAT		TO
	SUN		TO				
PRESENT TEMP	WINTER OCC		°F	UNOCC		°F	
	SUMMER OCC		°F	UNOCC		°F	

REMARKS:

LOCATION: FT. LEONARD WOOD BLDG: 5004

FILE: 5004AH1

AIR HANDLING UNIT SURVEY OBSERVATIONS

AHU-1	AHU NO.	MECH. ROOM	LOCATION (RM)
ACCU-1	REF. SYS. SERVING AHU	ALL	SERVES AREA

UNIT TYPE:

X	SINGLE ZN		2-PIPE FC		4-PIPE FC		UNIT HTR		H&V
	MULTIZONE		DOUBLE DT		REHEAT		INDUCTION		VAV
	NUMBER OF ZONES				OTHER				
	COMMENT:								

NAMEPLATE:

COMFORT MAKER					MFG.						MODEL
0.8	SUPPLY FAN HP		CENTURY		MFG.	8-118812-20					MODEL
	RET/EXH FAN HP				MFG.						MODEL
3600	CFM-HTG	3600	CFM-CLG	10%	MIN %OA	10%	MAX %OA	100%	% HTG AREA SERVED		
COMMENT: HOME STYLE FURNACE WITH DX COIL											
SUPPLY DUCT IS 14 X 42											

COILS:

X	NONE		STM		HW		ELEC		MOD VLV	PREHEAT
X	NONE		STM		HW	X	PROPANE		MOD VLV	HEATING
X	NONE		STM		HW		ELEC		MOD VLV	REHEAT
X	NONE		STM		HW		ELEC		MOD VLV	HUMID.
	NONE	X	DX		CW				MOD VLV	COOLING

OPERATION:

[illegible]

CONTROLS:

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:	X	SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	N	MAX OA (Y/N)	N	RA (Y/N)	N	EA (Y/N)	
	N	MA CONTROL		ECONO - DB		ECONO - ENT		OTHER	
DEMAND LIMIT:	N	(Y/N)							
COMMENTS: T-STAT CONTROL; O.A. WITH MANUAL DAMPER									

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 5004

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 5004CH1

REFRIGERATION EQUIPMENT SURVEY OBSERVATIONS

ACCU-1	CHILLER/COMPRESSOR NO.	OUTSIDE BLDG	LOCATION (RM)

UNIT TYPE:

	CENTRIFUGAL WITH WATER SIDE COOLING TOWER		OTHER
	RECIPROCATING WITH WATER SIDE COOLING TOWER	X	AHU'S SERVED AHU-1
	RECIPROCATING WITH AIR COOLED CONDENSING UNIT		
	ABSORPTION WITH WATER SIDE COOLING TOWER		
X	AIR COOLED CONDENSING UNIT		
	CHW	X	DX
			OTHER

NAMEPLATE:

CHILLER	GE	MFG.	BGTA120C3E	MODEL	219979543	SERIAL NO.
208	VOLTS	40	AMPS	3	PH	60
						10
						CAPACITY (TONS)
CONDENSER FANS	MFG.			MODEL		2
						# OF FANS
230	VOLTS	3.1	AMPS	1	PH	60
						0.5
						HP
DTW PUMP	MFG.			MODEL		
						SERIAL NO.
	VOLTS		AMPS		PH	
						HZ
						HP
CNW PUMP	MFG.			MODEL		
						SERIAL NO.
	VOLTS		AMPS		PH	
						HZ
						HP

COMMENTS:

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENT			
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?			
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	NO			
REQUIRED START TIME	700	600	600	600	600	600	1200				
REQUIRED STOP TIME	1500	2100	2100	2100	2100	2100	2100				
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
0	0	0	0	1	1	1	1	1	0	0	0

CONTROLS:

	PNEUMATIC	X	ELECTRIC	ELEC'NIC	DDC	COMMENTS
SETPOINTS	CWS (oF)		CWR (oF)	CNWS (oF)	CNWR (oF)	
PANEL INDICATORS						
- PRESSURE	LITE-HI		LITE-LOW	GAUGES		
- TEMPERATURE	LITE-HI		LITE-LOW	GAUGES		
- OTHER						
COMMENTS:	FM RADIO CONTROL					

FIELD SURVEY NOTES

BUILDING 5007

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD

BLDG: 5007

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 5007BLG

VI. BUILDING DATA SURVEY OBSERVATIONS

BLDG NO: 5007 BLDG NAME: HANGER

ZONE NO.	1	FUNCTION: AIRPORT HANGER						
OCCUPANCY HOURS:	M-F	700	TO	1700	SAT	0	TO	0
	SUN	0	TO	0				
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F			
	SUMMER OCC	°F		UNOCC	°F			

ZONE NO.	FUNCTION:							
OCCUPANCY HOURS:	M-F		TO		SAT		TO	
	SUN		TO					
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F			
	SUMMER OCC	°F		UNOCC	°F			

ZONE NO.	FUNCTION:							
OCCUPANCY HOURS:	M-F		TO		SAT		TO	
	SUN		TO					
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F			
	SUMMER OCC	°F		UNOCC	°F			

REMARKS:

FILE: 5007AH1

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:	X	SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	N	MAX OA (Y/N)	N	RA (Y/N)	N	EA (Y/N)	
		MA CONTROL		ECONO - DB		ECONO - ENT		OTHER	
DEMAND LIMIT:	Y	YES		NO					
COMMENTS:									

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 5007

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 5007CH1

REFRIGERATION EQUIPMENT SURVEY OBSERVATIONS

DX-1	CHILLER/COMPRESSOR NO.	OUTSIDE BLDG	LOCATION (RM)

UNIT TYPE:

	CENTRIFUGAL WITH WATER SIDE COOLING TOWER		OTHER
	RECIPROCATING WITH WATER SIDE COOLING TOWER	X	AHU'S SERVED AHU-1
	RECIPROCATING WITH AIR COOLED CONDENSING UNIT		
	ABSORPTION WITH WATER SIDE COOLING TOWER		
X	AIR COOLED CONDENSING UNIT		
	CHW	X	DX
			OTHER

NAMEPLATE:

CHILLER DAY & NIGHT	MFG.	NO NAME PLATE	MODEL	SERIAL NO.
240 VOLTS		MCA 1 PH	60 HZ	3 CAPACITY (TONS)
CONDENSER FANS	MFG.		MODEL	1 # OF FANS
VOLTS		AMPS	PH	0.1 HP
DTW PUMP	MFG.		MODEL	SERIAL NO.
VOLTS		AMPS	PH	HZ HP
CNW PUMP	MFG.		MODEL	SERIAL NO.
VOLTS		AMPS	PH	HZ HP

COMMENTS:

OPERATION:

HOURS ON:											
	S	M	T	W	T	F	S	COMMENT			
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?			
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	YES,			
REQUIRED START TIME	0	700	700	700	700	700	0	NO PINS			
REQUIRED STOP TIME	0	1700	1700	1700	1700	1700	0				
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
0	0	0	0	1	1	1	1	1	0	0	0

CONTROLS:

	PNEUMATIC	X	ELECTRIC	ELEC'NIC	DDC	COMMENTS
SETPOINTS	CWS (oF)		CWR (oF)	CNWS (oF)	CNWR (oF)	
PANEL INDICATORS						
- PRESSURE	LITE-HI		LITE-LOW	GAUGES		
- TEMPERATURE	LITE-HI		LITE-LOW	GAUGES		
- OTHER						

COMMENTS: FM RADIO CONTROL

LOCATION: FT. LEONARD WOOD BLDG: 5007

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: **AJN**

CHECKED BY: CEL

FILE: 5007UH1

AIR HANDLING UNIT SURVEY OBSERVATIONS

UH-1	AHU NO.	AIRCRAFT BAY	LOCATION (RM)
	REF. SYS. SERVING AHU	AIRCRAFT BAY	SERVES AREA

UNIT TYPE:

	SINGLE ZN	2—PIPE FC	4—PIPE FC	X	UNIT HTR	H&V
	MULTIZONE	DOUBLE DT	REHEAT		INDUCTION	VAV
	NUMBER OF ZONES		OTHER			
	COMMENT:	13 GAS—FIRED RADIANT HEATERS (CEILING MOUNTED) FUEL TYPE: PROPANE				

NAMEPLATE:

					MFG.						MODEL
0.1	SUPPLY FAN HP				MFG.						MODEL
	RET/EXH FAN HP				MFG.						MODEL
300	CFM-HTG	0	CFM-CLG	0%	MIN %OA	0%	MAX %OA	6.0%	% HTG AREA SERVED		
COMMENT: CFM IS USED TO CALCULATE HTG ENERGY											

COILS:

X	NONE		STM		HW		ELEC		MOD VLV	PREHEAT
X	NONE		FUEL OIL		HW		ELEC		MOD VLV	HEATING
X	NONE		STM		HW		ELEC		MOD VLV	REHEAT
X	NONE		STM		HW		EVAP MEDIA		MOD VLV	HUMID.
X	NONE		DX		CW				MOD VLV	COOLING

OPERATION:

HOURS ON:		S	M	T	W	T	F	S	COMMENTS		
PRESENT START TIME		0	0	0	0	0	0	0	TIMECLOCK?		
PRESENT STOP TIME		2400	2400	2400	2400	2400	2400	2400	NO		
REQUIRED START TIME		0	700	700	700	700	700	0			
REQUIRED STOP TIME		0	1700	1700	1700	1700	1700	0			
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	0	0	0	0	0	1	1	1

CONTROLS:

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (°F):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (°F):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	N	MAX OA (Y/N)	N	RA (Y/N)	N	EA (Y/N)	
		MA CONTROL		ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:	N	(Y/N)		NO					
COMMENTS:									

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY
CLIENT CONTRACT NO.: DACA 41-92-C-0098
CLIENT PROJ. ENG: DOUG CAGE
LOCATION: FT. LEONARD WOOD BLDG: 5007

EMC NO.: #3204-000
DATE: Mar-93
PREPARED BY: AJN
CHECKED BY: CEL
FILE: 5007UH2

AIR HANDLING UNIT SURVEY OBSERVATIONS			
UH-2	AHU NO.	AIRCRAFT BAY	LOCATION (RM)
	REF. SYS. SERVING AHU	AIRCRAFT BAY	SERVES AREA

UNIT TYPE:									
	SINGLE ZN		2-PIPE FC		4-PIPE FC	X	UNIT HTR		H&V
	MULTIZONE		DOUBLE DT		REHEAT		INDUCTION		VAV
	NUMBER OF ZONES			OTHER					
	COMMENT:	13 GAS-FIRED RADIANT HEATERS (CEILING MOUNTED) FUEL TYPE: PROPANE							

NAMEPLATE:											
					MFG.					MODEL	
0.1	SUPPLY FAN HP				MFG.					MODEL	
	RET/EXH FAN HP				MFG.					MODEL	
300	CFM-HTG	0	CFM-CLG	0%	MIN %OA	0%	MAX %OA	6.0%	% HTG AREA SERVED		
COMMENT: CFM IS USED TO CALCULATE HTG ENERGY											

COILS:										
X	NONE		STM		HW		ELEC		MOD VLV	PREHEAT
X	NONE		FUEL OIL		HW		ELEC		MOD VLV	HEATING
X	NONE		STM		HW		ELEC		MOD VLV	REHEAT
X	NONE		STM		HW		EVAP MEDIA		MOD VLV	HUMID.
X	NONE		DX		CW				MOD VLV	COOLING

OPERATION:											
HOURS ON:		S	M	T	W	T	F	S	COMMENTS		
PRESENT START TIME		0	0	0	0	0	0	0	TIMECLOCK?		
PRESENT STOP TIME		2400	2400	2400	2400	2400	2400	2400	NO		
REQUIRED START TIME		0	700	700	700	700	700	0			
REQUIRED STOP TIME		0	1700	1700	1700	1700	1700	0			
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	0	0	0	0	0	1	1	1

CONTROLS:									
		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (°F):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (°F):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	N	MAX OA (Y/N)	N	RA (Y/N)	N	EA (Y/N)	
		MA CONTROL		ECONO – DB		ECONO – ENT		OTHER	
DEMAND LIMIT:	N	(Y/N)		NO					
COMMENTS:									

FILE: 5007UH4

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (°F):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (°F):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	N	MAX OA (Y/N)	N	RA (Y/N)	N	EA (Y/N)	
		MA CONTROL		ECONO – DB		ECONO – ENT		OTHER	
DEMAND LIMIT:	N	(Y/N)		NO					
COMMENTS:									

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (°F):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (°F):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	N	MAX OA (Y/N)	N	RA (Y/N)	N	EA (Y/N)	
		MA CONTROL		ECONO – DB		ECONO – ENT		OTHER	
DEMAND LIMIT:	N	(Y/N)		NO					
COMMENTS:									

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 5007

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: **AJN**

CHECKED BY: CEL

FILE: 5007UH6

AIR HANDLING UNIT SURVEY OBSERVATIONS

UH-6	AHU NO.	AIRCRAFT BAY	LOCATION (RM)
	REF. SYS. SERVING AHU	AIRCRAFT BAY	SERVES AREA

UNIT TYPE:

	SINGLE ZN		2-PIPE FC		4-PIPE FC	X	UNIT HTR		H&V
	MULTIZONE		DOUBLE DT		REHEAT		INDUCTION		VAV
	NUMBER OF ZONES				OTHER				
	COMMENT:	13 GAS-FIRED RADIANT HEATERS (CEILING MOUNTED) FUEL TYPE: PROPANE							

NAMEPLATE:

				MFG.					MODEL
0.1	SUPPLY FAN HP			MFG.					MODEL
	RET/EXH FAN HP			MFG.					MODEL
300	CFM-HTG	0	CFM-CLG	0%	MIN %OA	0%	MAX %OA	6.0%	% HTG AREA SERVED
COMMENT: CFM IS USED TO CALCULATE HTG ENERGY									

COILS:

X	NONE		STM		HW		ELEC		MOD VLV	PREHEAT
X	NONE		FUEL OIL		HW		ELEC		MOD VLV	HEATING
X	NONE		STM		HW		ELEC		MOD VLV	REHEAT
X	NONE		STM		HW		EVAP MEDIA		MOD VLV	HUMID.
X	NONE		DX		CW				MOD VLV	COOLING

OPERATION:

HOURS ON:		S	M	T	W	T	F	S	COMMENTS		
PRESENT START TIME		0	0	0	0	0	0	0	TIMECLOCK?		
PRESENT STOP TIME		2400	2400	2400	2400	2400	2400	2400	NO		
REQUIRED START TIME		0	700	700	700	700	700	0			
REQUIRED STOP TIME		0	1700	1700	1700	1700	1700	0			
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	0	0	0	0	0	1	1	1

CONTROLS:

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (°F):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (°F):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	N	MAX OA (Y/N)	N	RA (Y/N)	N	EA (Y/N)	
		MA CONTROL		ECONO – DB		ECONO – ENT		OTHER	
DEMAND LIMIT:	N	(Y/N)		NO					
COMMENTS:									

LOCATION: FT. LEONARD WOOD BLDG: 5007

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: **AJN**

CHECKED BY: CEL

FILE: 5007UH7

AIR HANDLING UNIT SURVEY OBSERVATIONS

UH-7	AHU NO.	AIRCRAFT BAY	LOCATION (RM)
	REF. SYS. SERVING AHU	AIRCRAFT BAY	SERVES AREA

UNIT TYPE:

	SINGLE ZN		2-PIPE FC		4-PIPE FC	X	UNIT HTR		H&V
	MULTIZONE		DOUBLE DT		REHEAT		INDUCTION		VAV
	NUMBER OF ZONES			OTHER					
	COMMENT: 13 GAS-FIRED RADIANT HEATERS (CEILING MOUNTED) FUEL TYPE: PROPANE								

NAMEPLATE:

					MFG.						MODEL
0.1	SUPPLY FAN HP				MFG.						MODEL
	RET/EXH FAN HP				MFG.						MODEL
300	CFM-HTG	0	CFM-CLG	0%	MIN %OA	0%	MAX %OA	6.0%	% HTG AREA SERVED		
COMMENT: CFM IS USED TO CALCULATE HTG ENERGY											

COILS:

X	NONE		STM		HW		ELEC		MOD VLV	PREHEAT
X	NONE		FUEL OIL		HW		ELEC		MOD VLV	HEATING
X	NONE		STM		HW		ELEC		MOD VLV	REHEAT
X	NONE		STM		HW		EVAP MEDIA		MOD VLV	HUMID.
X	NONE		DX		CW				MOD VLV	COOLING

OPERATION:

HOURS ON:		S	M	T	W	T	F	S	COMMENTS		
PRESENT START TIME		0	0	0	0	0	0	0	TIMECLOCK?		
PRESENT STOP TIME		2400	2400	2400	2400	2400	2400	2400	NO		
REQUIRED START TIME		0	700	700	700	700	700	0			
REQUIRED STOP TIME		0	1700	1700	1700	1700	1700	0			
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	0	0	0	0	0	1	1	1

CONTROLS:

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (°F):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (°F):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	N	MAX OA (Y/N)	N	RA (Y/N)	N	EA (Y/N)	
		MA CONTROL		ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:	N	(Y/N)		NO					

COMMENTS:

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 5007

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: **AJN**

CHECKED BY: CEL

FILE: 5007UH8

AIR HANDLING UNIT SURVEY OBSERVATIONS

UH-8	AHU NO.	AIRCRAFT BAY	LOCATION (RM)
	REF. SYS. SERVING AHU	AIRCRAFT BAY	SERVES AREA

UNIT TYPE:

	SINGLE ZN	2-PIPE FC	4-PIPE FC	X	UNIT HTR		H&V
	MULTIZONE	DOUBLE DT	REHEAT		INDUCTION		VAV
	NUMBER OF ZONES		OTHER				
	COMMENT:	13 GAS-FIRED RADIANT HEATERS (CEILING MOUNTED) FUEL TYPE: PROPANE					

NAMEPLATE:

				MFG.					MODEL
0.1	SUPPLY FAN HP			MFG.					MODEL
	RET/EXH FAN HP			MFG.					MODEL
300	CFM-HTG	0	CFM-CLG	0%	MIN %OA	0%	MAX %OA	6.0%	% HTG AREA SERVED
COMMENT: CFM IS USED TO CALCULATE HTG ENERGY									

COILS:

X	NONE		STM		HW		ELEC		MOD VLV	PREHEAT
X	NONE		FUEL OIL		HW		ELEC		MOD VLV	HEATING
X	NONE		STM		HW		ELEC		MOD VLV	REHEAT
X	NONE		STM		HW		EVAP MEDIA		MOD VLV	HUMID.
X	NONE		DX		CW				MOD VLV	COOLING

OPERATION:

HOURS ON:		S	M	T	W	T	F	S	COMMENTS		
PRESENT START TIME		0	0	0	0	0	0	0	TIMECLOCK?		
PRESENT STOP TIME		2400	2400	2400	2400	2400	2400	2400	NO		
REQUIRED START TIME		0	700	700	700	700	700	0			
REQUIRED STOP TIME		0	1700	1700	1700	1700	1700	0			
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	0	0	0	0	0	1	1	1

CONTROLS:

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (°F):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (°F):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	N	MAX OA (Y/N)	N	RA (Y/N)	N	EA (Y/N)	
		MA CONTROL		ECONO – DB		ECONO – ENT		OTHER	
DEMAND LIMIT:	N	(Y/N)		NO					
COMMENTS:									

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 5007

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 5007UH9

AIR HANDLING UNIT SURVEY OBSERVATIONS

UH-9	AHU NO.	AIRCRAFT BAY	LOCATION (RM)
	REF. SYS. SERVING AHU	AIRCRAFT BAY	SERVES AREA

UNIT TYPE:

	SINGLE ZN		2-PIPE FC		4-PIPE FC	X	UNIT HTR		H&V
	MULTIZONE		DOUBLE DT		REHEAT		INDUCTION		VAV
	NUMBER OF ZONES			OTHER					
	COMMENT:	13 GAS-FIRED RADIANT HEATERS (CEILING MOUNTED) FUEL TYPE: PROPANE							

NAMEPLATE:

					MFG.						MODEL
0.1	SUPPLY FAN HP				MFG.						MODEL
	RET/EXH FAN HP				MFG.						MODEL
300	CFM-HTG	0	CFM-CLG	0%	MIN %OA	0%	MAX %OA	6.0%	% HTG AREA SERVED		
COMMENT: CFM IS USED TO CALCULATE HTG ENERGY											

COILS:

X	NONE	STM	HW	ELEC	MOD VLV	PREHEAT
X	NONE	FUEL OIL	HW	ELEC	MOD VLV	HEATING
X	NONE	STM	HW	ELEC	MOD VLV	REHEAT
X	NONE	STM	HW	EVAP MEDIA	MOD VLV	HUMID.
X	NONE	DX	CW		MOD VLV	COOLING

OPERATION:

OPERATION											
HOURS ON:	S	M	T	W	T	F	S	COMMENTS			
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?			
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	NO			
REQUIRED START TIME	0	700	700	700	700	700	0				
REQUIRED STOP TIME	0	1700	1700	1700	1700	1700	0				
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	0	0	0	0	0	1	1	1

CONTROLS:

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (°F):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (°F):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	N	MAX OA (Y/N)	N	RA (Y/N)	N	EA (Y/N)	
		MA CONTROL		ECONO – DB		ECONO – ENT		OTHER	
DEMAND LIMIT:	N	(Y/N)		NO					

COMMENTS:

LOCATION: FT. LEONARD WOOD BLDG: 5007

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: **AJN**

CHECKED BY: CEL

FILE: 5007UH10

AIR HANDLING UNIT SURVEY OBSERVATIONS

UH-10	AHU NO.	AIRCRAFT BAY	LOCATION (RM)
	REF. SYS. SERVING AHU	AIRCRAFT BAY	SERVES AREA

UNIT TYPE:

	SINGLE ZN	2-PIPE FC	4-PIPE FC	X	UNIT HTR	H&V
	MULTIZONE	DOUBLE DT	REHEAT		INDUCTION	VAV
	NUMBER OF ZONES		OTHER			
	COMMENT:	13 GAS-FIRED RADIANT HEATERS (CEILING MOUNTED) FUEL TYPE: PROPANE				

NAMEPLATE:

					MFG.						MODEL
0.1	SUPPLY FAN HP				MFG.						MODEL
	RET/EXH FAN HP				MFG.						MODEL
300	CFM-HTG	0	CFM-CLG	0%	MIN %OA	0%	MAX %OA	6.0%	% HTG AREA SERVED		
COMMENT: CFM IS USED TO CALCULATE HTG ENERGY											

COILS:

X	NONE		STM		HW		ELEC		MOD VLV	PREHEAT
X	NONE		FUEL OIL		HW		ELEC		MOD VLV	HEATING
X	NONE		STM		HW		ELEC		MOD VLV	REHEAT
X	NONE		STM		HW		EVAP MEDIA		MOD VLV	HUMID.
X	NONE		DX		CW				MOD VLV	COOLING

OPERATION:

HOURS ON:		S	M	T	W	T	F	S	COMMENTS		
PRESENT START TIME		0	0	0	0	0	0	0	TIMECLOCK?		
PRESENT STOP TIME		2400	2400	2400	2400	2400	2400	2400	NO		
REQUIRED START TIME		0	700	700	700	700	700	0			
REQUIRED STOP TIME		0	1700	1700	1700	1700	1700	0			
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	0	0	0	0	0	1	1	1

CONTROLS:

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (°F):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (°F):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	N	MAX OA (Y/N)	N	RA (Y/N)	N	EA (Y/N)	
		MA CONTROL		ECONO – DB		ECONO – ENT		OTHER	
DEMAND LIMIT:	N	(Y/N)		NO					
COMMENTS:									

FILE: 5007UH11

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (°F):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (°F):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	N	MAX OA (Y/N)	N	RA (Y/N)	N	EA (Y/N)	
		MA CONTROL		ECONO - DB		ECONO - ENT		OTHER	
DEMAND LIMIT:	N	(Y/N)		NO					
COMMENTS:									

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 5007

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: **AJN**

CHECKED BY: CEL

FILE: 5007UH12

AIR HANDLING UNIT SURVEY OBSERVATIONS

UH-12	AHU NO.	AIRCRAFT BAY	LOCATION (RM)
	REF. SYS. SERVING AHU	AIRCRAFT BAY	SERVES AREA

UNIT TYPE:

	SINGLE ZN		2-PIPE FC		4-PIPE FC	X	UNIT HTR		H&V
	MULTIZONE		DOUBLE DT		REHEAT		INDUCTION		VAV
	NUMBER OF ZONES				OTHER				
	COMMENT:	13 GAS-FIRED RADIANT HEATERS (CEILING MOUNTED) FUEL TYPE: PROPANE							

NAMEPLATE:

					MFG.					MODEL
0.1	SUPPLY FAN HP				MFG.					MODEL
	RET/EXH FAN HP				MFG.					MODEL
300	CFM-HTG	0	CFM-CLG	0%	MIN %OA	0%	MAX %OA	6.0%	% HTG AREA SERVED	
COMMENT: CFM IS USED TO CALCULATE HTG ENERGY										

COILS:

X	NONE		STM		HW		ELEC		MOD VLV	PREHEAT
X	NONE		FUEL OIL		HW		ELEC		MOD VLV	HEATING
X	NONE		STM		HW		ELEC		MOD VLV	REHEAT
X	NONE		STM		HW		EVAP MEDIA		MOD VLV	HUMID.
X	NONE		DX		CW				MOD VLV	COOLING

OPERATION:

HOURS ON:		S	M	T	W	T	F	S	COMMENTS		
PRESENT START TIME		0	0	0	0	0	0	0	TIMECLOCK?		
PRESENT STOP TIME		2400	2400	2400	2400	2400	2400	2400	NO		
REQUIRED START TIME		0	700	700	700	700	700	0			
REQUIRED STOP TIME		0	1700	1700	1700	1700	1700	0			
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	0	0	0	0	0	1	1	1

CONTROLS:

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (°F):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (°F):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	N	MAX OA (Y/N)	N	RA (Y/N)	N	EA (Y/N)	
		MA CONTROL		ECONO – DB		ECONO – ENT		OTHER	
DEMAND LIMIT:	N	(Y/N)		NO					
COMMENTS:									

FILE: 5007UH13

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (°F):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (°F):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	N	MAX OA (Y/N)	N	RA (Y/N)	N	EA (Y/N)	
		MA CONTROL		ECONO – DB		ECONO – ENT		OTHER	
DEMAND LIMIT:	N	(Y/N)		NO					
COMMENTS:									

FIELD SURVEY NOTES

BUILDING 5265

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD

BLDG: 5265

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 5265BLG

VI. BUILDING DATA SURVEY OBSERVATIONS

BLDG NO: 5265

BLDG NAME: DOL

ZONE NO.	1	FUNCTION: MAINTENANCE FACILITY						
OCCUPANCY HOURS:	M – F	700	TO	1600	SAT	0	TO	0
	SUN	0	TO	0				
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F			
	SUMMER OCC	°F		UNOCC	°F			

ZONE NO.		FUNCTION:							
OCCUPANCY HOURS:		M—F		TO		SAT		TO	
		SUN		TO					
PRESENT TEMP	WINTER OCC		°F		UNOCC	°F			
	SUMMER OCC		°F		UNOCC	°F			

ZONE NO.		FUNCTION:							
OCCUPANCY HOURS:		M—F		TO		SAT		TO	
		SUN		TO					
PRESENT TEMP	WINTER OCC		°F		UNOCC	°F			
	SUMMER OCC		°F		UNOCC	°F			

REMARKS:

LOCATION: FT. LEONARD WOOD BLDG: 5265

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: **AJN**

CHECKED BY: CEL

FILE: 5265ACB1

AIR HANDLING UNIT SURVEY OBSERVATIONS

AC-B-1	AHU NO.	MECH. RM NO. 6	LOCATION (RM)
C. PLANT	REF. SYS. SERVING AHU	OFFICES	SERVES AREA

UNIT TYPE:

X	SINGLE ZN		2—PIPE FC		4—PIPE FC		UNIT HTR		H&V
	MULTIZONE		DOUBLE DT		REHEAT		INDUCTION		VAV
	NUMBER OF ZONES				OTHER				
	COMMENT:								

NAMEPLATE:

DUNHAM - BUSH					MFG.					MODEL
0.5	SUPPLY FAN HP		CENTURY		MFG.	8-151195-1				MODEL
	RET/EXH FAN HP				MFG.					MODEL
610	CFM-HTG	610	CFM-CLG	10%	MIN %OA	100%	MAX %OA	0.1%	% HTG AREA SERVED	
COMMENT:										

COILS:

X	NONE		STM		HW		ELEC		MOD VLV	PREHEAT
	NONE		STM	X	HW		ELEC	X	MOD VLV	HEATING
X	NONE		STM		HW		ELEC		MOD VLV	REHEAT
X	NONE		STM		HW		ELEC		MOD VLV	HUMID.
	NONE		DX	X	CW			X	MOD VLV	COOLING

OPERATION:

[illegible]

CONTROLS:

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:	X	SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):	70	OCC HEAT		UNOCC HEAT	78	OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	Y	MIN OA (Y/N)	N	MAX OA (Y/N)	Y	RA (Y/N)	Y	EA (Y/N)	
	N	MA CONTROL	Y	ECONO-DB	N	ECONO-ENT		OTHER	
DEMAND LIMIT:	Y	(Y / N)							
COMMENTS:	O.A. AND R.A. DAMPERS SHARE SAME ACTUATOR								

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 5265

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 5265ACB2

AIR HANDLING UNIT SURVEY OBSERVATIONS

AC-B-2	AHU NO.	MECH. RM NO. 6	LOCATION (RM)
C. PLANT	REF. SYS. SERVING AHU	OFFICES	SERVES AREA

UNIT TYPE:

X	SINGLE ZN	2-PIPE FC	4-PIPE FC	UNIT HTR	H&V
	MULTIZONE	DOUBLE DT	REHEAT	INDUCTION	VAV
	NUMBER OF ZONES	OTHER			
	COMMENT:				

NAMEPLATE:

DUNHAM—BUSH					MFG.					MODEL
0.8	SUPPLY FAN HP		CENTURY		MFG.	8—151350—01				MODEL
	RET/EXH FAN HP				MFG.					MODEL
1160	CFM—HTG	1160	CFM—CLG	10%	MIN %OA	100%	MAX %OA	0.3%	% HTG AREA SERVED	
COMMENT:										

COILS:

X	NONE		STM		HW		ELEC		MOD VLV	PREHEAT
	NONE		STM	X	HW		ELEC	X	MOD VLV	HEATING
X	NONE		STM		HW		ELEC		MOD VLV	REHEAT
X	NONE		STM		HW		ELEC		MOD VLV	HUMID.
	NONE		DX	X	CW			X	MOD VLV	COOLING

OPERATION:

OPERATION											
HOURS ON:		S	M	T	W	T	F	S	COMMENTS		
PRESENT START TIME		0	0	0	0	0	0	0	TIMECLOCK?		
PRESENT STOP TIME		2400	2400	2400	2400	2400	2400	2400	YES,		
REQUIRED START TIME		0	700	700	700	700	700	0	NO PINS		
REQUIRED STOP TIME		0	1600	1600	1600	1600	1600	0			
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	1	1	1	1	1	1	1	1

CONTROLS:

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:	X	SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):	70	OCC HEAT		UNOCC HEAT	78	OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	Y	MIN OA (Y/N)	N	MAX OA (Y/N)	Y	RA (Y/N)	Y	EA (Y/N)	
	N	MA CONTROL	N	ECONO-DB	N	ECONO-ENT		OTHER	
DEMAND LIMIT:	Y	(Y / N)							
COMMENTS:	MANUAL DAMPERS								

FILE: 5265ACD2

[illegible]

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 5265

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 5265ACG2

AIR HANDLING UNIT SURVEY OBSERVATIONS

AC-G-2	AHU NO.	MECH. RM NO. 4	LOCATION (RM)
C. PLANT	REF. SYS. SERVING AHU	OFFICES	SERVES AREA

UNIT TYPE:

SINGLE ZN	2-PIPE FC	4-PIPE FC	UNIT HTR	H&V
MULTIZONE	DOUBLE DT	REHEAT	INDUCTION	X VAV
NUMBER OF ZONES	OTHER			
COMMENT:	FAN TERMINAL UNITS PROVIDE HEATING			

NAMEPLATE:

					MFG.					MODEL
7.5	SUPPLY FAN HP		CENTURY		MFG.	6-339040-03				MODEL
	RET/EXH FAN HP				MFG.					MODEL
6610	CFM-HTG	6610	CFM-CLG	10%	MIN %OA	100%	MAX %OA	3.9%	% HTG AREA SERVED	

COMMENT:

COILS:

X	NONE	STM	HW	ELEC	MOD VLV	PREHEAT
	NONE	STM	X HW	ELEC	X MOD VLV	HEATING
X	NONE	STM	HW	ELEC	MOD VLV	REHEAT
X	NONE	STM	HW	ELEC	MOD VLV	HUMID.
	NONE	DX	X CW		X MOD VLV	COOLING

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENTS
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	YES,
REQUIRED START TIME	0	700	700	700	700	700	0	NO PINS
REQUIRED STOP TIME	0	1600	1600	1600	1600	1600	0	

MONTHS ON:

J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	1	1	1	1	1	1	1	1

CONTROLS:

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:	X	SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):	70	OCC HEAT		UNOCC HEAT	78	OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK	60	MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)	N	EA (Y/N)	
	Y	MA CONTROL	Y	ECONO-DB	N	ECONO-ENT		OTHER	
DEMAND LIMIT:	Y	(Y / N)							

COMMENTS:

FILE: 5265ACG3

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:	X	SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)	N	EA (Y/N)	
	Y	MA CONTROL	Y	ECONO-DB	N	ECONO-ENT		OTHER	
DEMAND LIMIT:	Y	(Y / N)							
COMMENTS:									

FILE: 5265ACK1

	X	PNEUMATIC	ELECTRIC	ELEC'NIC	DDC	COMMENTS
THERMOSTAT TYPE:	X	SINGLE STPT	DUAL SETPNT	SETBACK		
SPACE SETPOINT (oF):	70	OCC HEAT	UNOCC HEAT	78 OCC COOL	UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK	COLD DECK	65 MIXED AIR	OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y MAX OA (Y/N)	Y RA (Y/N)	N EA (Y/N)	
	Y	MA CONTROL	Y ECONO-DB	N ECONO-ENT	OTHER	
DEMAND LIMIT:	Y	(Y / N)				
COMMENTS:	ONE O.A. DAMPER ACTUATOR; ONE R.A. DAMPER ACTUATOR					

LOCATION: FT. LEONARD WOOD BLDG: 5265

FILE: 5265ACK2

AIR HANDLING UNIT SURVEY OBSERVATIONS

AC-K-2	AHU NO.	MECH. RM NO. 3	LOCATION (RM)
C. PLANT	REF. SYS. SERVING AHU	OFFICES	SERVES AREA

UNIT TYPE:

[illegible]

NAMEPLATE:

					MFG.					MODEL
1.5	SUPPLY FAN HP		CENTURY		MFG.	8-151958-01				MODEL
	RET/EXH FAN HP				MFG.					MODEL
2660	CFM-HTG	2660	CFM-CLG	10%	MIN %OA	100%	MAX %OA	0.7%	% HTG AREA SERVED	
COMMENT:										

COILS:

X	NONE		STM		HW		ELEC		MOD VLV	PREHEAT
	NONE		STM	X	HW		ELEC	X	MOD VLV	HEATING
X	NONE		STM		HW		ELEC		MOD VLV	REHEAT
X	NONE		STM		HW		ELEC		MOD VLV	HUMID.
	NONE		DX	X	CW			X	MOD VLV	COOLING

OPERATION:

[illegible]

CONTROLS:

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:	X	SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):	70	OCC HEAT		UNOCC HEAT	78	OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK	65	MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)	N	EA (Y/N)	
	Y	MA CONTROL	Y	ECONO-DB	N	ECONO-ENT		OTHER	
DEMAND LIMIT:	Y	(Y / N)							
COMMENTS:									

FILE: 5265HVA1

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):	72	OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	N	MAX OA (Y/N)	N	RA (Y/N)	Y	EA (Y/N)	
	N	MA CONTROL	N	ECONO-DB	N	ECONO-ENT		OTHER	
DEMAND LIMIT:	Y	(Y / N)							
COMMENTS:									

FILE: 5265HVB1

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):	72	OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)	N	EA (Y/N)	
	N	MA CONTROL	N	ECONO-DB	N	ECONO-ENT		OTHER	
DEMAND LIMIT:	Y	(Y / N)							
COMMENTS: ONE ACTUATOR FOR O.A. AND R.A. DAMPERS									

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 5265

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 5265HVC1

AIR HANDLING UNIT SURVEY OBSERVATIONS

HV-C-1	AHU NO.	MECH. RM NO. 1	LOCATION (RM)
	REF. SYS. SERVING AHU	MAINTENANCE	SERVES AREA

UNIT TYPE:

	SINGLE ZN		2-PIPE FC		4-PIPE FC		UNIT HTR	X	H&V
	MULTIZONE		DOUBLE DT		REHEAT		INDUCTION		VAV
	NUMBER OF ZONES				OTHER				
	COMMENT:								

NAMEPLATE:

				MFG.					MODEL
0.8	SUPPLY FAN HP		CENTURY	MFG.		8-151350-1			MODEL
	RET/EXH FAN HP			MFG.					MODEL
1320	CFM-HTG	0	CFM-CLG	0%	MIN %OA	0%	MAX %OA	0.1%	% HTG AREA SERVED

COMMENT:

COILS:

X	NONE		STM		HW		ELEC		MOD VLV	PREHEAT
	NONE		STM	X	HW		ELEC	X	MOD VLV	HEATING
X	NONE		STM		HW		ELEC		MOD VLV	REHEAT
X	NONE		STM		HW		ELEC		MOD VLV	HUMID.
X	NONE		DX		CW				MOD VLV	COOLING

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENTS
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	YES,
REQUIRED START TIME	0	700	700	700	700	700	0	NO PINS
REQUIRED STOP TIME	0	1600	1600	1600	1600	1600	0	

MONTHS ON:

J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	1	1	1	1	1	1	1	1

CONTROLS:

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	N	MAX OA (Y/N)	Y	RA (Y/N)	Y	EA (Y/N)	
	N	MA CONTROL	N	ECONO-DB	N	ECONO-ENT		OTHER	
DEMAND LIMIT:	Y	(Y / N)							

COMMENTS:

LOCATION: FT. LEONARD WOOD BLDG: 5265

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: **AJN**

CHECKED BY: CEL

FILE: 5265HVD2

AIR HANDLING UNIT SURVEY OBSERVATIONS

HV-D-2	AHU NO.	MECH. RM NO. 7	LOCATION (RM)
	REF. SYS. SERVING AHU	MAINTENANCE	SERVES AREA

UNIT TYPE:

	SINGLE ZN		2-PIPE FC		4-PIPE FC		UNIT HTR	X	H&V
	MULTIZONE		DOUBLE DT		REHEAT		INDUCTION		VAV
	NUMBER OF ZONES				OTHER				
	COMMENT:								

NAMEPLATE:

				MFG.					MODEL
7.5	SUPPLY FAN HP		CENTURY	MFG.	6-350192-02				MODEL
	RET/EXH FAN HP			MFG.					MODEL
11800	CFM-HTG	0	CFM-CLG	10%	MIN %OA	100%	MAX %OA	2.5%	% HTG AREA SERVED

COMMENT:

COILS:

X	NONE		STM		HW		ELEC		MOD VLV	PREHEAT
	NONE		STM	X	HW		ELEC	X	MOD VLV	HEATING
X	NONE		STM		HW		ELEC		MOD VLV	REHEAT
X	NONE		STM		HW		ELEC		MOD VLV	HUMID.
X	NONE		DX		CW				MOD VLV	COOLING

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENTS
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	YES,
REQUIRED START TIME	0	700	700	700	700	700	0	NO PINS
REQUIRED STOP TIME	0	1600	1600	1600	1600	1600	0	

MONTHS ON:

[illegible]

CONTROLS:

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):	72	OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)	N	EA (Y/N)	
	N	MA CONTROL	N	ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:	Y	(Y / N)							

COMMENTS:

FILE: 5265HVD3

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:	X	SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)	N	EA (Y/N)	
	N	MA CONTROL	N	ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:	Y	(Y / N)							
COMMENTS:									

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 5265

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 5265HVD4

AIR HANDLING UNIT SURVEY OBSERVATIONS

HV-D-4	AHU NO.	MECH. RM NO. 7	LOCATION (RM)
	REF. SYS. SERVING AHU	MAINTENANCE	SERVES AREA

UNIT TYPE:

SINGLE ZN	2-PIPE FC	4-PIPE FC	UNIT HTR	X	H&V
MULTIZONE	DOUBLE DT	REHEAT	INDUCTION		VAV
NUMBER OF ZONES		OTHER			
COMMENT:					

NAMEPLATE:

DUNHAM-BUSH				MFG.	HAH040				MODEL
3.0	SUPPLY FAN HP	CENTURY		MFG.	6-350220-10				MODEL
	RET/EXH FAN HP			MFG.					MODEL
4920	CFM-HTG	0	CFM-CLG	17%	MIN %OA	100%	MAX %OA	2.5%	% HTG AREA SERVED
COMMENT:									

COILS:

X	NONE		STM		HW		ELEC		MOD VLV	PREHEAT
	NONE		STM	X	HW		ELEC	X	MOD VLV	HEATING
X	NONE		STM		HW		ELEC		MOD VLV	REHEAT
X	NONE		STM		HW		ELEC		MOD VLV	HUMID.
X	NONE		DX		CW				MOD VLV	COOLING

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENTS
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	YES,
REQUIRED START TIME	0	700	700	700	700	700	0	NO PINS
REQUIRED STOP TIME	0	1600	1600	1600	1600	1600	0	

MONTHS ON:

J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	1	1	1	1	1	1	1	1

CONTROLS:

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:	X	SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)	N	EA (Y/N)	
	N	MA CONTROL	N	ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:	Y	(Y / N)							

COMMENTS: ONE ACTUATOR FOR O.A. AND R.A. DAMPERS

LOCATION: FT. LEONARD WOOD BLDG: 5265

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: **AJN**

CHECKED BY: CEL

FILE: 5265HVE1

AIR HANDLING UNIT SURVEY OBSERVATIONS

HV-E-1	AHU NO.	MECH. RM NO. 2	LOCATION (RM)
	REF. SYS. SERVING AHU	MAINTENANCE	SERVES AREA

UNIT TYPE:

	SINGLE ZN		2-PIPE FC		4-PIPE FC		UNIT HTR	X	H&V
	MULTIZONE		DOUBLE DT		REHEAT		INDUCTION		VAV
	NUMBER OF ZONES				OTHER				
	COMMENT:								

NAMEPLATE:

DUNHAM-BUSH					MFG.	HAH100				MODEL
7.5	SUPPLY FAN HP		CENTURY		MFG.	6-350192-02				MODEL
	RET/EXH FAN HP				MFG.					MODEL
11700	CFM-HTG	0	CFM-CLG	22%	MIN %OA	100%	MAX %OA	8.2%	% HTG AREA SERVED	
COMMENT:										

COILS:

X	NONE		STM		HW		ELEC		MOD VLV	PREHEAT
	NONE		STM	X	HW		ELEC	X	MOD VLV	HEATING
X	NONE		STM		HW		ELEC		MOD VLV	REHEAT
X	NONE		STM		HW		ELEC		MOD VLV	HUMID.
X	NONE		DX		CW				MOD VLV	COOLING

OPERATION:

[illegible]

CONTROLS:

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)	N	EA (Y/N)	
	N	MA CONTROL	N	ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:	Y	(Y / N)							
COMMENTS: ONE ACTUATOR FOR O.A. AND R.A. DAMPERS									

CONTROLS:

FILE: 5265HVG3

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)	N	EA (Y/N)	
	N	MA CONTROL	N	ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:	Y	(Y / N)							
COMMENTS:									

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 5265

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 5265HVG5

AIR HANDLING UNIT SURVEY OBSERVATIONS

HV-G-5	AHU NO.	MECH. RM NO. 4	LOCATION (RM)
	REF. SYS. SERVING AHU	WINDOW REPAIR	SERVES AREA

UNIT TYPE:

SINGLE ZN	2-PIPE FC	4-PIPE FC	UNIT HTR	X	H&V
MULTIZONE	DOUBLE DT	REHEAT	INDUCTION		VAV
NUMBER OF ZONES	OTHER				
COMMENT:					

NAMEPLATE:

					MFG.						MODEL
5.0	SUPPLY FAN HP		CENTURY		MFG.	6-322465-01					MODEL
	RET/EXH FAN HP				MFG.						MODEL
8920	CFM-HTG	0	CFM-CLG	10%	MIN %OA	100%	MAX %OA	5.0%	% HTG AREA SERVED		
COMMENT:											

COILS:

X	NONE		STM		HW		ELEC		MOD VLV	PREHEAT
	NONE		STM	X	HW		ELEC	X	MOD VLV	HEATING
X	NONE		STM		HW		ELEC		MOD VLV	REHEAT
X	NONE		STM		HW		ELEC		MOD VLV	HUMID.
X	NONE		DX		CW				MOD VLV	COOLING

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENTS
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	YES,
REQUIRED START TIME	0	700	700	700	700	700	0	NO PINS
REQUIRED STOP TIME	0	1600	1600	1600	1600	1600	0	

MONTHS ON:

J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	1	1	1	1	1	1	1	1

CONTROLS:

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)	N	EA (Y/N)	
	N	MA CONTROL	N	ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:	Y	(Y / N)							

COMMENTS:

LOCATION: FT. LEONARD WOOD BLDG: 5265

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: **AJN**

CHECKED BY: CEL

FILE: 5265FC1

AIR HANDLING UNIT SURVEY OBSERVATIONS

FC-1	AHU NO.	BLDG PERIMETER	LOCATION (RM)
CV-1	REF. SYS. SERVING AHU	MAINTENANCE	SERVES AREA

UNIT TYPE:

	SINGLE ZN	X	2-PIPE FC		4-PIPE FC		UNIT HTR		H&V
	MULTIZONE		DOUBLE DT		REHEAT		INDUCTION		VAV
	NUMBER OF ZONES				OTHER				
	COMMENT:	31 HW UNIT HEATER FAN COILS							

NAMEPLATE:

NO NAME PLATE					MFG.					MODEL
3.4	SUPPLY FAN HP				MFG.					MODEL
	RET/EXH FAN HP				MFG.					MODEL
79100	CFM-HTG	0	CFM-CLG	0%	MIN %OA	0%	MAX %OA	9.7%	% HTG AREA SERVED	
COMMENT: TOTAL CFM FOR ALL FAN COILS										

COILS:

X	NONE		STM		HW		ELEC		MOD VLV	PREHEAT
	NONE		STM	X	HW		ELEC		MOD VLV	HEATING
X	NONE		STM		HW		ELEC		MOD VLV	REHEAT
X	NONE		STM		HW		EVAP MEDIA		MOD VLV	HUMID.
X	NONE		DX		CW				MOD VLV	COOLING

OPERATION:

HOURS ON:		S	M	T	W	T	F	S	COMMENTS		
PRESENT START TIME		0	0	0	0	0	0	0	TIMECLOCK?		
PRESENT STOP TIME		2400	2400	2400	2400	2400	2400	2400	NO		
REQUIRED START TIME		0	700	700	700	700	700	0			
REQUIRED STOP TIME		0	1600	1600	1600	1600	1600	0			
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	0	0	0	0	0	1	1	1

CONTROLS:

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (°F):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (°F):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	N	MAX OA (Y/N)	N	RA (Y/N)	N	EA (Y/N)	
	N	MA CONTROL	N	ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:	N	(Y/N)							

COMMENTS:

LOCATION: FT. LEONARD WOOD BLDG: 5265

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: **AJN**

CHECKED BY: CEL

FILE: 5265FC2

AIR HANDLING UNIT SURVEY OBSERVATIONS

FC-2	AHU NO.	BLDG PERIMETER	LOCATION (RM)
CV-2	REF. SYS. SERVING AHU	MAINTENANCE	SERVES AREA

UNIT TYPE:

	SINGLE ZN	X	2-PIPE FC		4-PIPE FC		UNIT HTR		H&V
	MULTIZONE		DOUBLE DT		REHEAT		INDUCTION		VAV
	NUMBER OF ZONES			OTHER					
	COMMENT:	24 HW UNIT HEATER FAN COILS							

NAMEPLATE:

NO NAME PLATE					MFG.						MODEL
2.6	SUPPLY FAN HP				MFG.						MODEL
	RET/EXH FAN HP				MFG.						MODEL
59261	CFM-HTG	0	CFM-CLG	0%	MIN %OA	0%	MAX %OA	4.3%	% HTG AREA SERVED		
COMMENT: TOTAL CFM FOR ALL FAN COILS											

COILS:

X	NONE		STM		HW		ELEC		MOD VLV	PREHEAT
	NONE		STM	X	HW		ELEC		MOD VLV	HEATING
X	NONE		STM		HW		ELEC		MOD VLV	REHEAT
X	NONE		STM		HW		EVAP MEDIA		MOD VLV	HUMID.
X	NONE		DX		CW				MOD VLV	COOLING

OPERATION:

HOURS ON:		S	M	T	W	T	F	S	COMMENTS		
PRESENT START TIME		0	0	0	0	0	0	0	TIMECLOCK?		
PRESENT STOP TIME		2400	2400	2400	2400	2400	2400	2400	NO		
REQUIRED START TIME		0	700	700	700	700	700	0			
REQUIRED STOP TIME		0	1600	1600	1600	1600	1600	0			
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	0	0	0	0	0	1	1	1

CONTROLS:

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (°F):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (°F):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	N	MAX OA (Y/N)	N	RA (Y/N)	N	EA (Y/N)	
	N	MA CONTROL	N	ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:	N	(Y/N)							
COMMENTS:									

COMMENTS:

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 5265

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 5265PMP2

REFRIGERATION EQUIPMENT SURVEY OBSERVATIONS

CHW PUMP	CHILLER/COMPRESSOR NO.	MECH. ROOM	LOCATION (RM)

UNIT TYPE:

	CENTRIFUGAL WITH WATER SIDE COOLING TOWER		OTHER
	RECIPROCATING WITH WATER SIDE COOLING TOWER	X	AHU'S SERVED AC-D-1 & AC-D-2
	RECIPROCATING WITH AIR COOLED CONDENSING UNIT		
	ABSORPTION WITH WATER SIDE COOLING TOWER		
	AIR COOLED CONDENSING UNIT		
CHW		DX	X OTHER
			CHW PUMP ONLY

NAMEPLATE:

CHILLER	MFG.	MODEL	SERIAL NO.
VOLTS	AMPS	PH	HZ
			CAPACITY (TONS)
CONDENSER FANS	MFG.	MODEL	# OF FANS
VOLTS	AMPS	PH	HZ
			HP
CW PUMP	MFG.	MODEL	SERIAL NO.
VOLTS	AMPS	PH	HZ
			0.75 HP
CNW PUMP	MFG.	MODEL	SERIAL NO.
VOLTS	AMPS	PH	HZ
			HP

COMMENTS:

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENT			
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?			
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	NO TIMECLOCK			
REQUIRED START TIME	0	700	700	700	700	700	0				
REQUIRED STOP TIME	0	1600	1600	1600	1600	1600	0				
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
0	0	0	0	1	1	1	1	1	0	0	0

CONTROLS:

	PNEUMATIC	X	ELECTRIC	ELEC'NIC	DDC	COMMENTS
SETPOINTS	CWS (oF)		CWR (oF)	CNWS (oF)	CNWR (oF)	
PANEL INDICATORS						
- PRESSURE	LITE-HI		LITE-LOW	GAUGES		
- TEMPERATURE	LITE-HI		LITE-LOW	GAUGES		
- OTHER						
COMMENTS:						

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 5265

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 5265PMP4

REFRIGERATION EQUIPMENT SURVEY OBSERVATIONS

CHW PUMP	CHILLER/COMPRESSOR NO.	MECH. ROOM	LOCATION (RM)

UNIT TYPE:

	CENTRIFUGAL WITH WATER SIDE COOLING TOWER		OTHER
	RECIPROCATING WITH WATER SIDE COOLING TOWER	X	AHU'S SERVED AC-F-1
	RECIPROCATING WITH AIR COOLED CONDENSING UNIT		
	ABSORPTION WITH WATER SIDE COOLING TOWER		
	AIR COOLED CONDENSING UNIT		
	CHW	DX	X OTHER
			CHW PUMP ONLY

NAMEPLATE:

CHILLER	MFG.	MODEL	SERIAL NO.
VOLTS	AMPS	PH	HZ
CONDENSER FANS	MFG.	MODEL	# OF FANS
VOLTS	AMPS	PH	HZ
CW PUMP	MFG.	MODEL	SERIAL NO.
VOLTS	AMPS	PH	HZ
CNW PUMP	MFG.	MODEL	SERIAL NO.
VOLTS	AMPS	PH	HZ

COMMENTS:

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENT			
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?			
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	NO TIMECLOCK			
REQUIRED START TIME	0	700	700	700	700	700	0				
REQUIRED STOP TIME	0	1600	1600	1600	1600	1600	0				
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
0	0	0	0	1	1	1	1	1	0	0	0

CONTROLS:

	PNEUMATIC	X	ELECTRIC	ELEC'NIC	DDC	COMMENTS
SETPOINTS	CWS (oF)		CWR (oF)	CNWS (oF)	CNWR (oF)	
PANEL INDICATORS						
- PRESSURE	LITE-HI		LITE-LOW	GAUGES		
- TEMPERATURE	LITE-HI		LITE-LOW	GAUGES		
- OTHER						
COMMENTS:						

FILE: 5265PMP5

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
SETPOINTS		CWS (oF)		CWR (oF)		CNWS (oF)		CNWR (oF)	
PANEL INDICATORS									
- PRESSURE		LITE-HI		LITE-LOW		GAUGES			
- TEMPERATURE		LITE-HI		LITE-LOW		GAUGES			
- OTHER									
COMMENTS:									

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
SETPOINTS		PSIG	190	HW SUPPLY					
RESET CONTROL (oF)		HW HIGH		HW LOW		OA LOW		OA HIGH	
BURNER CONTROLS		O2 TRIM (Y/N)		OTHER					
COMMENTS:									

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
SETPOINTS		PSIG	190	HW SUPPLY					
RESET CONTROL (oF)		HW HIGH		HW LOW		OA LOW		OA HIGH	
BURNER CONTROLS		O2 TRIM (Y/N)		OTHER					
COMMENTS:									

COMMENTS:

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 5265

EMC NO.: #3204.000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 5265DHW2

DOMESTIC HW SURVEY OBSERVATIONS

DHW-2	BOILER/CONVERTER NO.	HALLWAY CLOSET	LOCATION (RM)
ELEC.	SOURCE OF HEATING (PLANT)	AREA B	SERVES AREA

UNIT TYPE:

NO.2 OIL	NO.6 OIL	N.GAS	X	ELEC	FUELS:
STM/HW	HTHW/HW	HTHW/STM		OTHER	CONVERTER TYPE:

COMMENT:

NAMEPLATE:

A.O. SMITH	MFG.	DRE120 810P	MODEL	4800	CAPACITY OUTPUT (WATTS)
	MFG.		MODEL		CAPACITY OUTPUT (BTUH)

DOMESTIC HW CIRCULATION PUMP: NONE

HW PUMP 1 - HP	MFG.	MODEL
HW PUMP 2 - HP	MFG.	MODEL
HW PUMP 3 - HP	MFG.	MODEL

COMMENT:

DIMENSION:	DIAMETER (INCHES)	HEIGHT OR LENGTH (INCHES)	120 GALLON
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OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENT			
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?			
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	NO			
REQUIRED START TIME	0	700	700	700	700	700	0				
REQUIRED STOP TIME	0	1600	1600	1600	1600	1600	0				
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	1	1	1	1	1	1	1	1

CONTROLS:

	PNEUMATIC	X	ELECTRIC	ELEC'NIC	DDC	COMMENTS
SETPOINTS			HW SUPPLY			
COMMENTS:						

COMMENTS:

FIELD SURVEY NOTES

BUILDING 5267

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD

BLDG: 5267

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 5267BLG

VI. BUILDING DATA SURVEY OBSERVATIONS

BLDG NO: 5267 BLDG NAME: DISPATCH

ZONE NO.	1	FUNCTION: ADMINISTRATION					
OCCUPANCY HOURS:	M-F	500	TO	2400	SAT	600	TO 1800
	SUN	600	TO	1800			
PRESENT TEMP	WINTER OCC	°F	UNOCC	°F			
	SUMMER OCC	°F	UNOCC	°F			

ZONE NO.		FUNCTION:					
OCCUPANCY HOURS:	M-F		TO		SAT		TO
	SUN		TO				
PRESENT TEMP	WINTER OCC	°F	UNOCC	°F			
	SUMMER OCC	°F	UNOCC	°F			

ZONE NO.		FUNCTION:					
OCCUPANCY HOURS:	M-F		TO		SAT		TO
	SUN		TO				
PRESENT TEMP	WINTER OCC	°F	UNOCC	°F			
	SUMMER OCC	°F	UNOCC	°F			

REMARKS:

COMMENTS:

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 5267

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 5267PMP2

REFRIGERATION EQUIPMENT SURVEY OBSERVATIONS

CHW PUMP	CHILLER/COMPRESSOR NO.	MECH. ROOM	LOCATION (RM)

UNIT TYPE:

CENTRIFUGAL WITH WATER SIDE COOLING TOWER		OTHER
RECIPROCATING WITH WATER SIDE COOLING TOWER	X	AHU'S SERVED AHU-1
RECIPROCATING WITH AIR COOLED CONDENSING UNIT		
ABSORPTION WITH WATER SIDE COOLING TOWER		
AIR COOLED CONDENSING UNIT		
CHW	DX	X OTHER
		CHW PUMP ONLY

NAMEPLATE:

CHILLER	MFG.		MODEL		SERIAL NO.
VOLTS		AMPS	PH	HZ	CAPACITY (TONS)
CONDENSER FANS	MFG.		MODEL		# OF FANS
VOLTS		AMPS	PH	HZ	HP
CW PUM TACO	MFG.		MODEL		SERIAL NO.
VOLTS		AMPS	PH	HZ	0.33 HP
CNW PUMP	MFG.		MODEL		SERIAL NO.
VOLTS		AMPS	PH	HZ	HP

COMMENTS:

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENT
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	NO TIMECLOCK
REQUIRED START TIME	600	500	500	500	500	500	600	
REQUIRED STOP TIME	1800	2400	2400	2400	2400	2400	1800	

MONTHS ON:

J	F	M	A	M	J	J	A	S	O	N	D
0	0	0	0	1	1	1	1	1	0	0	0

CONTROLS:

	PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
SETPOINTS	CWS (oF)		CWR (oF)		CNWS (oF)		CNWR (oF)	
PANEL INDICATORS								
- PRESSURE	LITE-HI		LITE-LOW		GAUGES			
- TEMPERATURE	LITE-HI		LITE-LOW		GAUGES			
- OTHER								

COMMENTS:

LOCATION: FT. LEONARD WOOD BLDG: 5267

EMC NO.: #3204.000

DATE: Mar-93

PREPARED BY: **AJN**

CHECKED BY: CEL

FILE: 5267DHW1

DOMESTIC HW SURVEY OBSERVATIONS

DHW-1	BOILER/CONVERTER NO.	MECH RM	LOCATION (RM)
ELEC.	SOURCE OF HEATING (PLANT)	ALL	SERVES AREA

UNIT TYPE:

	NO.2 OIL		NO.6 OIL		N.GAS	X	ELEC		FUELS:
	STM/HW		HTHW/HW		HTHW/STM		OTHER		CONVERTER TYPE:

COMMENT:

NAMEPLATE:

A.O. SMITH	MFG.	DEN 30 102	MODEL	4500	CAPACITY OUTPUT (WATTS)
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	MFG.		MODEL		CAPACITY OUTPUT (BTUH)

DOMESTIC HW CIRCULATION PUMP: NO

	HW PUMP 1 – HP		MFG.		MODEL
	HW PUMP 2 – HP		MFG.		MODEL
	HW PUMP 3 – HP		MFG.		MODEL

COMMENT:

DIMENSION:	19	DIAMETER (INCHES)	46	HEIGHT OR LENGTH (INCHES)	30	GALLON
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OPERATION:

[illegible]

MONTHS ON:

[illegible]

CONTROLS:

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
SETPOINTS				HW SUPPLY					

COMMENTS:

FIELD SURVEY NOTES

BUILDING 6150

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD

BLDG: 6150

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 6150BLG

VI. BUILDING DATA SURVEY OBSERVATIONS

BLDG NO: 6150 BLDG NAME: ADMINISTRATION/MAINTENANCE

ZONE NO.	1	FUNCTION:						
OCCUPANCY HOURS:	M-F	700	TO	1600	SAT	0	TO	0
	SUN	0	TO	0				
PRESENT TEMP	WINTER OCC	°F	UNOCC	°F				
	SUMMER OCC	°F	UNOCC	°F				

ZONE NO.	FUNCTION:			
OCCUPANCY HOURS:	M-F	TO	SAT	TO
	SUN	TO		
PRESENT TEMP	WINTER OCC	°F	UNOCC	°F
	SUMMER OCC	°F	UNOCC	°F

ZONE NO.	FUNCTION:			
OCCUPANCY HOURS:	M-F	TO	SAT	TO
	SUN	TO		
PRESENT TEMP	WINTER OCC	°F	UNOCC	°F
	SUMMER OCC	°F	UNOCC	°F

REMARKS:

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 6150

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 6150AH1

AIR HANDLING UNIT SURVEY OBSERVATIONS

HVAC-1	AHU NO.	MECH. RM.	LOCATION (RM)
ACCU-1, BLR-1	REF. SYS. SERVING AHU	ADMIN. OFFICES	SERVES AREA

UNIT TYPE:

	SINGLE ZN		2-PIPE FC		4-PIPE FC		UNIT HTR		H&V
X	MULTIZONE		DOUBLE DT		REHEAT		INDUCTION		VAV
3	NUMBER OF ZONES			OTHER					
	COMMENT:	PNEUMATIC ACTUATORS							

NAMEPLATE:

AIRTHERM				MFG.	2N982H				MODEL
2.0	SUPPLY FAN HP	DAYTON		MFG.					MODEL
1.5	RET/EXH FAN HP			MFG.					MODEL
2850	CFM-HTG	2850	CFM-CLG	20%	MIN %OA	100%	MAX %OA	24%	% HTG AREA SERVED

COMMENT:

COILS:

X	NONE		STM		HW		ELEC		MOD VLV	PREHEAT
	NONE		STM	X	HW		ELEC		MOD VLV	HEATING
X	NONE		STM		HW		ELEC		MOD VLV	REHEAT
X	NONE		STM		HW		ELEC		MOD VLV	HUMID.
	NONE	X	DX		CW				MOD VLV	COOLING

OPERATION:

OPERATION:											
HOURS ON:	S	M	T	W	T	F	S	COMMENTS			
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?			
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	YES,			
REQUIRED START TIME	0	700	700	700	700	700	0	DOES NOT WORK			
REQUIRED STOP TIME	0	1600	1600	1600	1600	1600	0				
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	1	1	1	1	1	1	1	1

CONTROLS:

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS	
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK				
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL		
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER		
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)	Y	EA (Y/N)		
	Y	MA CONTROL		ECONO-DB		ECONO-ENT		OTHER		
DEMAND LIMIT:	Y	YES		NO						

COMMENTS: R.A. AND O.A. SHARE THE SAME ACTUATOR

LOCATION: FT. LEONARD WOOD BLDG: 6150

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: **AJN**

CHECKED BY: CEL

FILE: 6150AH2

AIR HANDLING UNIT SURVEY OBSERVATIONS

HV-1	AHU NO.	MECH. RM.	LOCATION (RM)
BLR-1	REF. SYS. SERVING AHU	WORK SHOP	SERVES AREA

UNIT TYPE:

	SINGLE ZN	2-PIPE FC	4-PIPE FC	UNIT HTR	X	H&V
	MULTIZONE	DOUBLE DT	REHEAT	INDUCTION		VAV
	NUMBER OF ZONES		OTHER			
	COMMENT:	FACE & BYPASS DAMPERS				

NAMEPLATE:

					MFG.					MODEL
5.0	SUPPLY FAN HP				MFG.					MODEL
	RET/EXH FAN HP				MFG.					MODEL
6350	CFM – HTG	6350	CFM – CLG	100%	MIN %OA	100%	MAX %OA	9%	% HTG AREA SERVED	

COMMENT:

COILS:

X	NONE		STM		HW		ELEC		MOD VLV	PREHEAT
	NONE	X	STM		HW		ELEC		MOD VLV	HEATING
X	NONE		STM		HW		ELEC		MOD VLV	REHEAT
X	NONE		STM		HW		ELEC		MOD VLV	HUMID.
X	NONE		DX		CW				MOD VLV	COOLING

OPERATION:

[illegible]

CONTROLS:

	X	PNEUMATIC		ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	N	MAX OA (Y/N)	N	RA (Y/N)	N	EA (Y/N)	
	N	MA CONTROL		ECONO – DB		ECONO – ENT		OTHER	
DEMAND LIMIT:	N	YES		NO					

COMMENTS:

LOCATION: FT. LEONARD WOOD BLDG: 6150

FILE: 6150FC1

AIR HANDLING UNIT SURVEY OBSERVATIONS

FC-1	AHU NO.	WORK BAY	LOCATION (RM)
BLR-1	REF. SYS. SERVING AHU	WORK BAY	SERVES AREA

UNIT TYPE:

	SINGLE ZN	X	2-PIPE FC		4-PIPE FC		UNIT HTR		H&V
	MULTIZONE		DOUBLE DT		REHEAT		INDUCTION		VAV
	NUMBER OF ZONES					OTHER			
	COMMENT:	11 HW UNIT HEATER FAN COILS							

NAMEPLATE:

NO NAME PLATE					MFG.						MODEL
0.4	SUPPLY FAN HP				MFG.						MODEL
	RET/EXH FAN HP				MFG.						MODEL
4600	CFM - HTG	0	CFM - CLG	0%	MIN %OA	0%	MAX %OA	67.0%	% HTG AREA SERVED		
COMMENT: TOTAL CFM FOR 4 FAN COILS											

COILS:

X	NONE		STM		HW		ELEC		MOD VLV	PREHEAT
	NONE		STM	X	HW		ELEC		MOD VLV	HEATING
X	NONE		STM		HW		ELEC		MOD VLV	REHEAT
X	NONE		STM		HW		EVAP MEDIA		MOD VLV	HUMID.
X	NONE		DX		CW				MOD VLV	COOLING

OPERATION:

HOURS ON:		S	M	T	W	T	F	S	COMMENTS		
PRESENT START TIME		0	0	0	0	0	0	0	TIMECLOCK?		
PRESENT STOP TIME		2400	2400	2400	2400	2400	2400	2400	NO		
REQUIRED START TIME		0	700	700	700	700	700	0			
REQUIRED STOP TIME		0	1600	1600	1600	1600	1600	0			
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	0	0	0	0	0	1	1	1

CONTROLS:

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:		SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (°F):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (°F):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	N	MAX OA (Y/N)	N	RA (Y/N)	N	EA (Y/N)	
	N	MA CONTROL		ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:	N	(Y/N)							
COMMENTS:									

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 6150

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 6150CH1

REFRIGERATION EQUIPMENT SURVEY OBSERVATIONS

ACCU-1	CHILLER/COMPRESSOR NO. .	OUTSIDE BLDG	LOCATION (RM)

UNIT TYPE:

	CENTRIFUGAL WITH WATER SIDE COOLING TOWER		OTHER
	RECIPROCATING WITH WATER SIDE COOLING TOWER	X	AHU'S SERVED HVAC-1
	RECIPROCATING WITH AIR COOLED CONDENSING UNIT		
	ABSORPTION WITH WATER SIDE COOLING TOWER		
X	AIR COOLED CONDENSING UNIT		
	CHW	X	DX
			OTHER

NAMEPLATE:

CHILLER	FEDDERS	MFG.		MODEL		SERIAL NO.
208	VOLTS	44	AMPS	3	PH	60 HZ 8.8 CAPACITY (TONS)
CONDENSER FANS	MFG.		MODEL		2	# OF FANS
208	VOLTS	2.2	AMPS	3	PH	60 HZ 0.33 HP
DTW PUMP	MFG.		MODEL			SERIAL NO.
	VOLTS		AMPS		PH	HZ HP
CNW PUMP	MFG.		MODEL			SERIAL NO.
	VOLTS		AMPS		PH	HZ HP

COMMENTS:

OPERATION:

HOURS ON:		S	M	T	W	T	F	S	COMMENT		
PRESENT START TIME		0	0	0	0	0	0	0	TIMECLOCK?		
PRESENT STOP TIME		2400	2400	2400	2400	2400	2400	2400	NO		
REQUIRED START TIME		0	700	700	700	700	700	0			
REQUIRED STOP TIME		0	1600	1600	1600	1600	1600	0			
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
0	0	0	0	1	1	1	1	1	0	0	0

CONTROLS:

	PNEUMATIC	X	ELECTRIC	ELEC'NIC	DDC	COMMENTS
SETPOINTS	CWS (oF)		CWR (oF)	CNWS (oF)	CNWR (oF)	
PANEL INDICATORS						
- PRESSURE	LITE-HI		LITE-LOW	GAUGES		
- TEMPERATURE	LITE-HI		LITE-LOW	GAUGES		
- OTHER						

COMMENTS: FM RADIO CONTROL SWITCH

CONTROLS:

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 6150

EMC NO.: #3204.000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 6150DHW1

DOMESTIC HW SURVEY OBSERVATIONS

DHW-1	BOILER/CONVERTER NO.	MECH RM	LOCATION (RM)
ELEC.	SOURCE OF HEATING (PLANT)	ALL	SERVES AREA

UNIT TYPE:

NO.2 OIL	NO.6 OIL	N.GAS	X	ELEC	FUELS:
STM/HW	HTHW/HW	HTHW/STM		OTHER	CONVERTER TYPE:

COMMENT:

NAMEPLATE:

JACKSON	MFG.	MODEL	4500	CAPACITY OUTPUT (WATTS)
	MFG.	MODEL		CAPACITY OUTPUT (BTUH)

DOMESTIC HW CIRCULATION PUMP: NONE

HW PUMP 1 - HP	MFG.	MODEL
HW PUMP 2 - HP	MFG.	MODEL
HW PUMP 3 - HP	MFG.	MODEL

COMMENT:

DIMENSION:	36	DIAMETER (INCHES)	60	HEIGHT OR LENGTH (INCHES)	80	GALLON
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OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENT			
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?			
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	NO			
REQUIRED START TIME	0	700	700	700	700	700	0				
REQUIRED STOP TIME	0	1600	1600	1600	1600	1600	0				
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	1	1	1	1	1	1	1	1

CONTROLS:

	PNEUMATIC	X	ELECTRIC	ELEC'NIC	DDC	COMMENTS
SETPOINTS			HW SUPPLY			
COMMENTS:						

FIELD SURVEY NOTES

BUILDING 6505

FIELD SURVEY NOTES

TO: FILE, FT. LEONARD WOOD
FR: CARL LUNDSTROM
DT: 16 NOVEMBER 1992

RE: BLDG 6505, WELL PUMPS AND WATER TREATMENT

Regarding controls:

- One well pump and three distribution pumps to monitor
- Ground reservoir
- Inject chlorine
- They need to monitor flow.
- Could check status of pumps

Regarding remote wells:

- They have remote wells at 1420, 5282, 10309, and 10222.

ENERGY CALCULATIONS

BUILDING 7391

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD

BLDG: 7391

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 7391BLG

VI. BUILDING DATA SURVEY OBSERVATIONS

BLDG NO: 7391 BLDG NAME: NCO CLUB

ZONE NO.	1		FUNCTION:ENGINEERING CLUB						
OCCUPANCY HOURS:	M—F	700	TO	2400	SAT	1400	TO	2400	
	SUN	0	TO	400					
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F				
	SUMMER OCC	°F		UNOCC	°F				

ZONE NO.		2		FUNCTION: CONFERENCE ROOM, DINING					
OCCUPANCY HOURS:		M-F	700	TO	2400	SAT	1400	TO	2400
		SUN	0	TO	400				
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F				
	SUMMER OCC	°F		UNOCC	°F				

ZONE NO.		FUNCTION:							
OCCUPANCY HOURS:		M—F		TO		SAT		TO	
		SUN		TO					
PRESENT TEMP	WINTER OCC		°F		UNOCC	°F			
	SUMMER OCC		°F		UNOCC	°F			

REMARKS: SIMILAR TO BLDG 4109
NEED SCHEDULE AND TEMPERATURE OVERRIDE IN CASHIERS CAGE
NEED BETTER TEMPERATURE CONTROL BY OCCUPANT
PROBLEMS WITH TEMPERATURE CONTROL
DCFA MANAGES CLUBS AND AAFES
SUPERVISER IN CHARGE OVER NCO CLUBS:
LAN NGUYEN PH. NO. 329-6533
ENGINEERING CLUB (NCO)
BLDG. 7391, FT LEONARD WOOD, MO. 65473

LOCATION: FT. LEONARD WOOD BLDG: 7391

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: **AJN**

CHECKED BY: CEL

FILE: 7391AH1

AIR HANDLING UNIT SURVEY OBSERVATIONS

AHU-1	AHU NO.	ROOM B4	LOCATION (RM)
CH-1	REF. SYS. SERVING AHU	MAIN DINING	SERVES AREA

UNIT TYPE:

X	SINGLE ZN		2-PIPE FC		4-PIPE FC		UNIT HTR		H&V
	MULTIZONE		DOUBLE DT		REHEAT		INDUCTION		VAV
	NUMBER OF ZONES				OTHER				
	COMMENT:								

NAMEPLATE:

McQUAY					MFG.	LS222H				MODEL
7.5	SUPPLY FAN HP		LINCOLN		MFG.	S.N. 472543				MODEL
	RET/EXH FAN HP				MFG.					MODEL
11750	CFM-H TG	11750	CFM-CLG	43%	MIN %OA	100%	MAX %OA	26%	% HTG AREA SERVED	

COMMENT:

COILS:

X	NONE		STM		HW		ELEC		MOD VLV	PREHEAT
	NONE		STM	X	HW		ELEC	X	MOD VLV	HEATING
X	NONE		STM		HW		ELEC		MOD VLV	REHEAT
X	NONE		STM		HW		ELEC		MOD VLV	HUMID.
	NONE		DX	X	CW			X	MOD VLV	COOLING

OPERATION:

[illegible]

CONTROLS:

		PNEUMATIC		ELECTRIC	X	ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:	X	SINGLE STPT		DUAL SETPNT		SETBACK			J.C. CONTROLS
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)	N	EA (Y/N)	
	Y	MA CONTROL	N	ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:	Y	(Y/N)							

COMMENTS:

FILE: 7391AH2

		PNEUMATIC		ELECTRIC	X	ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:	X	SINGLE STPT		DUAL SETPNT		SETBACK			J.C. CONTROLS
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)	N	EA (Y/N)	
	Y	MA CONTROL	N	ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:	Y	(Y/N)							
COMMENTS:									

CONTROLS:

LOCATION: FT. LEONARD WOOD BLDG: 7391

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: **AJN**

CHECKED BY: CEL

FILE: 7391AH4

AIR HANDLING UNIT SURVEY OBSERVATIONS

AHU-4	AHU NO.	MECH. RM NO. 2	LOCATION (RM)
CH-1	REF. SYS. SERVING AHU	DINING ROOM	SERVES AREA

UNIT TYPE:

X	SINGLE ZN	2-PIPE FC	4-PIPE FC	UNIT HTR	H&V
	MULTIZONE	DOUBLE DT	REHEAT	INDUCTION	VAV
	NUMBER OF ZONES	OTHER			
	COMMENT:				

NAMEPLATE:

McQUAY					MFG.	LS108H				MODEL
1.5	SUPPLY FAN HP		LINCOLN		MFG.	1430				MODEL
	RET/EXH FAN HP				MFG.					MODEL
3800	CFM - HTG	3800	CFM - CLG	40%	MIN %OA	100%	MAX %OA	14%	% HTG AREA SERVED	
COMMENT:										

COILS:

X	NONE		STM		HW		ELEC		MOD VLV	PREHEAT
	NONE		STM	X	HW		ELEC	X	MOD VLV	HEATING
X	NONE		STM		HW		ELEC		MOD VLV	REHEAT
X	NONE		STM		HW		ELEC		MOD VLV	HUMID.
	NONE		DX	X	CW			X	MOD VLV	COOLING

OPERATION:

[illegible]

CONTROLS:

		PNEUMATIC		ELECTRIC	X	ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:	X	SINGLE STPT		DUAL SETPNT		SETBACK			J.C. CONTROLS
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)	N	EA (Y/N)	
	Y	MA CONTROL	N	ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:	Y	(Y/N)							
COMMENTS:									

LOCATION: FT. LEONARD WOOD BLDG: 7391

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: **AJN**

CHECKED BY: CEL

FILE: 7391AH5

AIR HANDLING UNIT SURVEY OBSERVATIONS

AHU-5	AHU NO.	MECH. RM NO. 2	LOCATION (RM)
CH-1	REF. SYS. SERVING AHU	LOBBY, RESTROOMS	SERVES AREA

UNIT TYPE:

X	SINGLE ZN		2-PIPE FC		4-PIPE FC		UNIT HTR		H&V
	MULTIZONE		DOUBLE DT		REHEAT		INDUCTION		VAV
	NUMBER OF ZONES				OTHER				
	COMMENT:								

NAMEPLATE:

McQUAY					MFG.	LS111H				MODEL
3.0	SUPPLY FAN HP		LINCOLN		MFG.	S.N. 481754				MODEL
	RET/EXH FAN HP				MFG.					MODEL
4950	CFM-HTG	4950	CFM-CLG	40%	MIN %OA	100%	MAX %OA	18%	% HTG AREA SERVED	
COMMENT:										

COILS:

X	NONE		STM		HW		ELEC		MOD VLV	PREHEAT
	NONE		STM	X	HW		ELEC	X	MOD VLV	HEATING
X	NONE		STM		HW		ELEC		MOD VLV	REHEAT
X	NONE		STM		HW		ELEC		MOD VLV	HUMID.
	NONE		DX	X	CW			X	MOD VLV	COOLING

OPERATION:

[illegible]

CONTROLS:

		PNEUMATIC		ELECTRIC	X	ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:	X	SINGLE STPT		DUAL SETPNT		SETBACK			J.C. CONTROLS
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)	N	EA (Y/N)	
	Y	MA CONTROL	N	ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:	Y	(Y/N)							
COMMENTS:									

LOCATION: FT. LEONARD WOOD BLDG: 7391

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: **AJN**

CHECKED BY: CEL

FILE: 7391AH6

AIR HANDLING UNIT SURVEY OBSERVATIONS

AHU-6	AHU NO.	MECH. RM NO. 2	LOCATION (RM)
CH-1	REF. SYS. SERVING AHU	BAR, STORE	SERVES AREA

UNIT TYPE:

X	SINGLE ZN		2-PIPE FC		4-PIPE FC		UNIT HTR		H&V
	MULTIZONE		DOUBLE DT		REHEAT		INDUCTION		VAV
	NUMBER OF ZONES				OTHER				
	COMMENT:								

NAMEPLATE:

McQUAY					MFG.	LS111H				MODEL
3.0	SUPPLY FAN HP		LINCOLN		MFG.	S.N. 481755				MODEL
	RET/EXH FAN HP				MFG.					MODEL
4800	CFM – HTG	4800	CFM – CLG	67%	MIN %OA	100%	MAX %OA	9%	% HTG AREA SERVED	

COMMENT:

COILS:

X	NONE		STM		HW		ELEC		MOD VLV	PREHEAT
	NONE		STM	X	HW		ELEC	X	MOD VLV	HEATING
X	NONE		STM		HW		ELEC		MOD VLV	REHEAT
X	NONE		STM		HW		ELEC		MOD VLV	HUMID.
	NONE		DX	X	CW			X	MOD VLV	COOLING

OPERATION:

[illegible]

CONTROLS:

		PNEUMATIC		ELECTRIC	X	ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:	X	SINGLE STPT		DUAL SETPNT		SETBACK			J.C. CONTROLS
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)	N	EA (Y/N)	
	Y	MA CONTROL	N	ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:	Y	(Y/N)							
COMMENTS:									

LOCATION: FT. LEONARD WOOD BLDG: 7391

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: **AJN**

CHECKED BY: CEL

FILE: 7391AH7

AIR HANDLING UNIT SURVEY OBSERVATIONS

AHU-7	AHU NO.	MECH. RM NO. 2	LOCATION (RM)
CH-1	REF. SYS. SERVING AHU	KITCHEN	SERVES AREA

UNIT TYPE:

	SINGLE ZN		2- PIPE FC		4- PIPE FC		UNIT HTR	X	H&V
	MULTIZONE		DOUBLE DT		REHEAT		INDUCTION		VAV
	NUMBER OF ZONES			OTHER					
	COMMENT:								

NAMEPLATE:

CARRIER					MFG.	39EH11					MODEL
5.0	SUPPLY FAN HP	CENTURY			MFG.	6-355825-01					MODEL
	RET/EXH FAN HP				MFG.						MODEL
4000	CFM-HTG	0	CFM-CLG	75%	MIN %OA	100%	MAX %OA	11%	% HTG AREA SERVED		
COMMENT:											

COILS:

X	NONE		STM		HW		ELEC		MOD VLV	PREHEAT
	NONE		STM	X	HW		ELEC	X	MOD VLV	HEATING
X	NONE		STM		HW		ELEC		MOD VLV	REHEAT
X	NONE		STM		HW		ELEC		MOD VLV	HUMID.
	NONE		DX	X	CW			X	MOD VLV	COOLING

OPERATION:

[illegible]

CONTROLS:

		PNEUMATIC		ELECTRIC	X	ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:	X	SINGLE STPT		DUAL SETPNT		SETBACK			J.C. CONTROLS
SPACE SETPOINT (oF):		OCC HEAT		UNOCC HEAT		OCC COOL		UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED A/R		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	Y	MAX OA (Y/N)	Y	RA (Y/N)	N	EA (Y/N)	
	Y	MA CONTROL	N	ECONO-DB		ECONO-ENT		OTHER	
DEMAND LIMIT:	Y	(Y/N)							
COMMENTS:									

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 7391

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 7391CH1

REFRIGERATION EQUIPMENT SURVEY OBSERVATIONS

CH-1	CHILLER/COMPRESSOR NO.	MECH. ROOM NO. 2	LOCATION (RM)

UNIT TYPE:

	CENTRIFUGAL WITH WATER SIDE COOLING TOWER		OTHER
	RECIPROCATING WITH WATER SIDE COOLING TOWER	X	AHU'S SERVED AHU-1, AHU-2,
X	RECIPROCATING WITH AIR COOLED CONDENSING UNIT		AHU-3, AHU-4,
	ABSORPTION WITH WATER SIDE COOLING TOWER		AHU-5, AHU-6,
	AIR COOLED CONDENSING UNIT		
X	CHW	DX	OTHER

NAMEPLATE:

CHILLER	CARRIER	MFG.	38AE064510	MODEL	X197855	SERIAL NO.
208	VOLTS	119	AMPS	3	PH	60 HZ
						144 CAPACITY (TONS)
CONDENSER FANS	MFG.			MODEL		6 # OF FANS
200	VOLTS	4.6	AMPS	1	PH	60 HZ
						0.5 HP
CW PUM	CENTURY	MFG.	6-311460-1	MODEL		SERIAL NO.
208	VOLTS	16	AMPS	3	PH	60 HZ
						5 HP
CNW PUMP	MFG.			MODEL		SERIAL NO.
	VOLTS		AMPS		PH	
						HZ
						HP

COMMENTS: BACKUP CW PUMP IS TYPICAL

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENT			
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?			
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	NO			
REQUIRED START TIME	0	700	700	700	700	700	1400				
REQUIRED STOP TIME	400	2400	2400	2400	2400	2400	2400				
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
0	0	0	0	1	1	1	1	1	0	0	0

CONTROLS:

	PNEUMATIC	X	ELECTRIC	ELEC'NIC	DDC	COMMENTS
SETPOINTS	CWS (oF)		CWR (oF)	CNWS (oF)	CNWR (oF)	
PANEL INDICATORS						
- PRESSURE	LITE-HI		LITE-LOW	GAUGES		
- TEMPERATURE	LITE-HI		LITE-LOW	GAUGES		
- OTHER						
COMMENTS:						

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 7391

EMC NO.: #3204.000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 7391DHW1

DOMESTIC HW SURVEY OBSERVATIONS

DHW-1	BOILER/CONVERTER NO.	MECH RM	LOCATION (RM)
LP GAS	SOURCE OF HEATING (PLANT)		SERVES AREA

UNIT TYPE:

NO.2 OIL	NO.6 OIL	X	LP GAS	ELEC	FUELS:
STM/HW	HTHW/HW		HTHW/STM	OTHER	CONVERTER TYPE:

COMMENT:

NAMEPLATE:

RUUD	MFG.	RF98-180	MODEL	180000	CAPACITY OUTPUT (BTUH)
	MFG.		MODEL		CAPACITY OUTPUT (BTUH)

DOMESTIC HW CIRCULATION PUMP: NONE

HW PUMP 1 - HP	MFG.	MODEL
HW PUMP 2 - HP	MFG.	MODEL
HW PUMP 3 - HP	MFG.	MODEL

COMMENT:

DIMENSION:	24	DIAMETER (INCHES)	60	HEIGHT OR LENGTH (INCHES)	97	GALLON
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OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENT			
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?			
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	NO			
REQUIRED START TIME	0	700	700	700	700	700	1400				
REQUIRED STOP TIME	400	2400	2400	2400	2400	2400	2400				
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	1	1	1	1	1	1	1	1

CONTROLS:

	PNEUMATIC	X	ELECTRIC	ELEC'NIC	DDC	COMMENTS
SETPOINTS		145	HW SUPPLY			
COMMENTS:						

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY
CLIENT CONTRACT NO.: DACA 41-92-C-0098
CLIENT PROJ. ENG: DOUG CAGE
LOCATION: FT. LEONARD WOOD BLDG: 7391

DATE: Mar-93
PREPARED BY: AJN
CHECKED BY: CEL
FILE: 7391DHW2

DOMESTIC HW SURVEY OBSERVATIONS			
DHW - 2	BOILER/CONVERTER NO.	MECH RM	LOCATION (RM)
LP GAS	SOURCE OF HEATING (PLANT)		SERVES AREA

UNIT TYPE:									
	NO.2 OIL		NO.6 OIL	X	LP GAS		ELEC		FUELS:
	STM/HW		HTHW/HW		HTHW/STM		OTHER		CONVERTER TYPE:
COMMENT:									

NAMEPLATE:					
RUUD	MFG.	RF76-250	MODEL	250000	CAPACITY OUTPUT (BTUH)
	MFG.		MODEL		CAPACITY OUTPUT (BTUH)
DOMESTIC HW CIRCULATION PUMP:		NONE			
	HW PUMP 1 - HP		MFG.		MODEL
	HW PUMP 2 - HP		MFG.		MODEL
	HW PUMP 3 - HP		MFG.		MODEL
COMMENT:					

DIMENSION:	24	DIAMETER (INCHES)	48	HEIGHT OR LENGTH (INCHES)	76 GALLON
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[illegible]

CONTROLS:									
		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
SETPOINTS			140	HW SUPPLY					
COMMENTS:									

FIELD SURVEY NOTES

BUILDING 9000

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD

BLDG: 9000

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 9000BLG

VI. BUILDING DATA SURVEY OBSERVATIONS

BLDG NO: 9000 BLDG NAME: FRONT GATE

ZONE NO.	1	FUNCTION: SECURITY CHECK POINT							
OCCUPANCY HOURS:	M-F	0	TO	2400	SAT	0	TO	2400	
	SUN	0	TO	2400					
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F				
	SUMMER OCC	°F		UNOCC	°F				

ZONE NO.		FUNCTION:							
OCCUPANCY HOURS:		M—F		TO		SAT		TO	
		SUN		TO					
PRESENT TEMP	WINTER OCC	°F		UNOCC	°F				
	SUMMER OCC	°F		UNOCC	°F				

ZONE NO.		FUNCTION:							
OCCUPANCY HOURS:		M – F		TO		SAT		TO	
		SUN		TO					
PRESENT TEMP	WINTER OCC		°F		UNOCC	°F			
	SUMMER OCC		°F		UNOCC	°F			

REMARKS:

FILE: 9000AC1

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:	X	SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):	70	OCC HEAT	70	UNOCC HEAT	72	OCC COOL	72	UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	N	MAX OA (Y/N)	N	RA (Y/N)	N	EA (Y/N)	
	N	MA CONTROL	N	ECONO - DB	N	ECONO - ENT	N	OTHER	
DEMAND LIMIT:	Y	YES		NO					
COMMENTS:									

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 9000

EMC NO.: #3204-000

DATE: Mar-93

PREPARED BY: **AJN**

CHECKED BY: CEL

FILE: 9000AC2

AIR HANDLING UNIT SURVEY OBSERVATIONS

ACU-2	AHU NO.	MECH. ROOM	LOCATION (RM)
ACCU-2	REF. SYS. SERVING AHU	OFFICE AREA	SERVES AREA

UNIT TYPE:

X	SINGLE ZN		2-PIPE FC		4-PIPE FC		UNIT HTR		H&V
	MULTIZONE		DOUBLE DT		REHEAT		INDUCTION		VAV
	NUMBER OF ZONES				OTHER				
	COMMENT:	GAS-FIRED FURNACE							

NAMEPLATE:

RUUD					MFG.						MODEL	
0.3	SUPPLY FAN HP				MFG.						MODEL	
	RET/EXH FAN HP				MFG.						MODEL	
550	CFM - HTG	550	CFM - CLG	0%	MIN %OA	0%	MAX %OA	40%	% HTG AREA SERVED			
COMMENT:												

COILS:

X	NONE		STM		HW		ELEC		MOD VLV	PREHEAT
X	NONE		STM		HW		ELEC		MOD VLV	HEATING
X	NONE		STM		HW		ELEC		MOD VLV	REHEAT
X	NONE		STM		HW		ELEC		MOD VLV	HUMID.
	NONE	X	DX		CW				MOD VLV	COOLING

OPERATION:

[illegible]

CONTROLS:

		PNEUMATIC	X	ELECTRIC		ELEC'NIC		DDC	COMMENTS
THERMOSTAT TYPE:	X	SINGLE STPT		DUAL SETPNT		SETBACK			
SPACE SETPOINT (oF):	70	OCC HEAT	70	UNOCC HEAT	72	OCC COOL	72	UNOCC COOL	
OTHER SETPOINTS (oF):		HOT DECK		COLD DECK		MIXED AIR		OTHER	
DAMPER CONTROL:	N	MIN OA (Y/N)	N	MAX OA (Y/N)	N	RA (Y/N)	N	EA (Y/N)	
	N	MA CONTROL	N	ECONO-DB	N	ECONO-ENT	N	OTHER	
DEMAND LIMIT:	Y	YES		NO					
COMMENTS:									

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 9000

EMC NO.: #9204-000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 9000CH1

REFRIGERATION EQUIPMENT SURVEY OBSERVATIONS

ACCU-1	CHILLER/COMPRESSOR NO.	OUTSIDE BLDG	LOCATION (RM)

UNIT TYPE:

	CENTRIFUGAL WITH WATER SIDE COOLING TOWER		OTHER
	RECIPROCATING WITH WATER SIDE COOLING TOWER	X	AHU'S SERVED ACU-1
	RECIPROCATING WITH AIR COOLED CONDENSING UNIT		
	ABSORPTION WITH WATER SIDE COOLING TOWER		
X	AIR COOLED CONDENSING UNIT		
	CHW	X	DX
			OTHER

NAMEPLATE:

CHILLER	GE	MFG.	BGTA860R1D01	MODEL	209089606	SERIAL NO.
230	VOLTS	32.2	MCA	1	PH	60 HZ
						3 CAPACITY (TONS)
CONDENSER FANS	MFG.			MODEL		1 # OF FANS
230	VOLTS	2.3	AMPS		PH	HZ
						0.33 HP
DTW PUMP	MFG.			MODEL		SERIAL NO.
	VOLTS		AMPS		PH	HZ
						HP
CNW PUMP	MFG.			MODEL		SERIAL NO.
	VOLTS		AMPS		PH	HZ
						HP

COMMENTS:

OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENT			
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?			
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	NO			
REQUIRED START TIME	0	0	0	0	0	0	0				
REQUIRED STOP TIME	2400	2400	2400	2400	2400	2400	2400				
MONTHS ON:											
J	F	M	A	M	J	J	A	S	O	N	D
0	0	0	0	1	1	1	1	1	0	0	0

CONTROLS:

		PNEUMATIC	X	ELECTRIC		ELECTRIC		DDC	COMMENTS
SETPOINTS		CWS (oF)		CWR (oF)		CNWS (oF)		CNWR (oF)	
PANEL INDICATORS									
- PRESSURE	N	LITE-HI		LITE-LOW		GAUGES			
- TEMPERATURE	N	LITE-HI		LITE-LOW		GAUGES			
- OTHER									

COMMENTS: FM RADIO CONTROL SWITCH

LOCATION: FT. LEONARD WOOD BLDG: 9000

FILE: 9000CH2

LOCATION (RM)

OTHER

Q

COMMENTS:

COMMENTS:

E M C ENGINEERS, INC.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD BLDG: 9000

EMC NO.: #3204.000

DATE: Mar-93

PREPARED BY: AJN

CHECKED BY: CEL

FILE: 9000DHW1

DOMESTIC HW SURVEY OBSERVATIONS

DHW-1	BOILER/CONVERTER NO.	MECH RM	LOCATION (RM)
ELEC.	SOURCE OF HEATING (PLANT)	ALL	SERVES AREA

UNIT TYPE:

NO.2 OIL	NO.6 OIL	N.GAS	X	ELEC	FUELS:
STM/HW	HTHW/HW	HTHW/STM		OTHER	CONVERTER TYPE:

COMMENT:

NAMEPLATE:

RUUD	MFG.	PLP15-1	MODEL	2000	CAPACITY OUTPUT (WATTS)
	MFG.		MODEL		CAPACITY OUTPUT (BTUH)

DOMESTIC HW CIRCULATION PUMP: NONE

HW PUMP 1 - HP	MFG.	MODEL
HW PUMP 2 - HP	MFG.	MODEL
HW PUMP 3 - HP	MFG.	MODEL

COMMENT:

DIMENSION:	18	DIAMETER (INCHES)	24	HEIGHT OR LENGTH (INCHES)	15	GALLON
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OPERATION:

HOURS ON:	S	M	T	W	T	F	S	COMMENT
PRESENT START TIME	0	0	0	0	0	0	0	TIMECLOCK?
PRESENT STOP TIME	2400	2400	2400	2400	2400	2400	2400	NO
REQUIRED START TIME	0	0	0	0	0	0	0	
REQUIRED STOP TIME	2400	2400	2400	2400	2400	2400	2400	

MONTHS ON:

J	F	M	A	M	J	J	A	S	O	N	D
1	1	1	1	1	1	1	1	1	1	1	1

CONTROLS:

	PNEUMATIC	X	ELECTRIC	ELEC'NIC	DDC	COMMENTS
SETPOINTS			HW SUPPLY			

COMMENTS: